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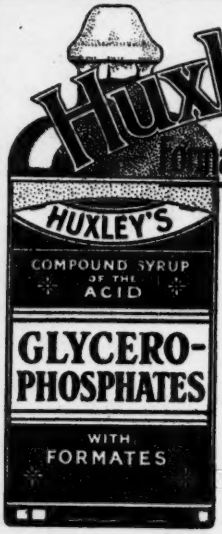

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*" Scire est nescire, nisi id me
Scire alius sciret."*

MARCH, 1920.

QUEENE ELIZABETHES ACHADEMY.

(British Museum, *Lansdowne MS.* 98.)

A SIXTEENTH-CENTURY SCHEME FOR A LONDON UNIVERSITY.

CONTRIBUTED BY

L. M. GRIFFITHS, M.R.C.S. Eng., L.R.C.P. Ed.

SIR HUMPHREY GILBERT (1539–1583), who was half-brother to Walter Raleigh, laid before the Queen (*c.* 1570) a MS. dealing with a plan for " The erection of an Achademy in London for educacion of her Maiestes Wardes, and others the youth of nobility and gentlemen." Gilbert brings before Elizabeth the desirability of the scheme by saying:—

" fforasmuch as (moste excellent soveraigne) the moste parte of noble men and gentlemen that happen to be your Maiestes Wardes, the Custody of their bodies beinge of bownty grawnted to some, in rewarde of service or otherwise, not without your honorable Confidence of their good educacion, yet, neverthelesse, most commonly by such to whom they are committed, or by those to whom such Committees have sould them, being eyther

of evil religion, or insufficient qualities, are, thorough the defaltes of their guardens, for the moste part brought vp, to no small grief of their frendes, in Idlenes and lascivious pastimes, estranged from all serviceable vertues to their prince and Cowntrey, obscurely drowned in educacion for sparing Charges, of purpose to abase their mindes, leaste, being better qualified, they should disdaine to stowpe to the mariage of such purchasers daughters; As, also, for that the greatest nomber of younge gentlemen within this Realme are most Conversant abowte London, where your Maiestes Cowrte hath most ordinarie residence; Yt were good (as I thincke, vnder Your Highnes most gratious Correction,) that, for their better educacions, there should be an Achademy erected in sorte."

F. J. Furnivall—in his edition published by the Early English Text Society in 1869—says: "The plan of the Achademy is in fact one for the establishment of a great London University for the education of youths in the art of political, social, and practical life,—a kind of prototype of the London University so wisely pleaded for of late years by Professor Seeley,[1] which should gather into itself the whole range of modern London teachers and studies. I venture to think that Sir Humphrey's scheme will not detract from his fame for nobleness of spirit, keenness of sight, and directness of aim." (p. xi.)

Furnivall quotes other interesting references to Gilbert from the poet Gascoigne in 1576, *Hakluyt's Voyages*, 1600, vol. iii., p. 145, and Froude's *Short Studies on Great Subjects*, vol. ii., pp. 136–45.

It is of special interest to note the way in which Gilbert dealt with the medical work in the scheme.

There shalbe one Reader of naturall philosophie, who shalbe yearely allowed for the same, ... 40[li.]

* * * * *

There shalbe entertained one Doctor of phisick, who shall one day reade phisick, and another daie Chirurgerie, in the

[1] "A Plea for more Universities" by Seeley appeared in *The London Student* of April, 1868.

Englishe toung, towching all kindes of Vlcers, Sores, Phistiloes, wowndes, &c. Togeather with all kindes of medicines for the same, as well Chimice [Chemical] as otherwise, and shalbe yearely allowed, ... 100li

This Reader shall never alleage [refer to] any medicine, be yt of simples, salues, saltes, balmes, oyles, spirites, tinctures, or otherwise, But that he shall declare the reason philosophicall of euery particuler ingredience for such operacion, And shew his hearers the mechanicall making and working thereof, with all manner of vesselles, furnishes, and other Instrumentes and vtensiles apertaining to the same.

This phisition shall continually practize togeather with the naturall philosophor, by the fire and otherwise, to search and try owt the secreates of nature, as many waies as they possiblie may. And shalbe sworne once euery yeare to deliuer into the Treasorer his office, faire and plaine written in Parchment, without Equiuocacions or Enigmaticall phrases, vnder their handes, all those their proofes and trialles made within the forepassed yeare, Togeather with the true evente of thinges, and all other necessary accidentes growing therby, To thend that their Successors may knowe both the way of their working, and the event thereof, the better to follow the good, and avoyd the evill, which in time must of force bring great thinges to light, yf in Awcomistrie [alchemy] there be any such thinges hidden. ffor whose saffetyes I would wish the Statute of the 5th of Henry the 4th towching multiplicacion to be dispensed at large.

The Phisition shall practize to reade Chirurgerie, becawse, thorough wante of learning therein, we haue verie few good Chirurgions, yf any at all, By reason that Chirurgerie is not now to be learned in any other place then in a Barbors shoppe, And in that shoppe, most dawngerous, especially in tyme of plague, when the ordinarie trimming of men for Clenlynes must be done by those which haue to do with infected personnes.

This Philosophor and phisition shall haue a garden apointed them which they shall furnish and maintaine with all kindes of simples; and shalbe yearely allowed, besides their Lectures, for their afforesaid extra ordinarie Charge and practizes, 100li.

* * * * *

There shalbe one keeper of the Liberarie of the Achademy, whose Charge shalbe to see the bookes there saffely kepte, to Cawse them to be bownd in good sorte, made fast, and orderly set, And shall keepe a Register of all the bookes in the said Liberarie, that he may geve accompte of them when the Master of the Wardes, or the Rector of the Achademy shall apoincte; and shalbe yearely allowed, ... 26li

This Keeper, after every marte [book fair], shall Cawse the bringers of bookes into England to exhibit to him their Registers, before they vtter any to any other person, that he may pervse the same, and take Choyse of such as the Achademie shall wante, and shall make the Master of the Wardes, or the Rector of the Achademy, privy to his Choyse, vpon whose warrante the bookes so provided shalbe payed for. And there shalbe yearely allowed for the buying of bookes for the said Liberary, and other necessary instrumentes, ... 40li.

All Printers in England shall for ever be Charged to deliuer into the Liberary of the Achademy, at their owne Charges, one Copy, well bownde, of euery booke, proclamacion, or pamflette, that they shall printe.

* * * * *

There shalbe geven in stocke for the furnishing of a Liberarie and Instrumentes apertaining to the same, Togeather with the buying of horses, as afforesaid,[1] and all other necessary thinges for the first furnishing of this Achademy, ... 2000li.

The whole yearely wages and Charges of this Achademy amownteth vnto .. .. 2507li. 6s. 8d.

The whole yearely Charges for the Commons of the said Readers, officers, and seruantes in this Achademy amownteth vnto 459li. 6s. 8d.

which maketh yearely in all .. .. 2966li. 13s. 4d.

Here wanteth levyes for the building or buying of howses for this Achademy.

All the publique Readers of arte and the common lawes shall once within every six yeares set forth some new bookes in printe, according to their severall professions.

Also every one of those which shall publiquely teache any of the languages as afforesaid, shall once every 3 yeares publish in printe some Translation into the English tounge of some good worke, as neare as may be for the advawncing of those thinges which shalbe practized in the said Achademy.

All which bookes shall for ever be entituled as set forth by

[1] The reference to this is an earlier portion of the MS. in these terms : "There shalbe entertained into the said Achademy one good horsman, to teache noble men and gentlemen to ride, make, and handle, a ready horse, exercizing them to runne at Ringe, Tilte, Towrney, and cowrse of the fielde, yf they shalbe armed. And also to skirmish on horsbacke with pistolles, not taking for the learning of any one of them above 10s. by the moneth, he finding them horses for that purpose, and shalbe ready bownd to keepe theare 10 greate horses for the said exercize, beinge yearely allowed therefore, 333li. 6s. 8d. This Rider shall haue allowed vnto him at the first erecting of the Stable, to buy his horses, 266li. 13s. 4d. This Rider, at his first Coming vnto the office, shall enter into bondes with suffitient sureties to leave vnto the Achademie, at his death or departure, the said horses, in asgood estate as he receaved them, or others as good, or the full summe which he was allowed for the buying of them."

the gentlemen of Queene Elizabethes Achademy, wherby all the nations of the worlde shall, once every 6 yeares at the furthest, receaue greate benefitt, to your highnes immortall fame.

* * * * *

At this present, the estate of gentlemen cannot well traine vp their children within this Realme but eyther in Oxford or Cambridge, whereof this ensueth :

ffirst, being theare, they vtterly lose their tymes yf they doe not follow learning onely. ffor there is no other gentlemanlike qualitie to be attained.

Also, by the evill example of suche, those which would aply their studies are drawen to licentiousnes and Idlenes ; and, therefore, yt were every way better that they were in any other place than theare.

* * * * *

O noble prince, that god shall blesse so farre as to be onely meane of bringing this seely [simple], frosen, Island into such everlasting honnour that all the nations of the World shall knowe and say, when the face of an English gentleman appeareth, that he is eyther a Sowldiour, a philosophor, or a gallant Cowrtier ; whereby in glory your Maiesty shall make your sellf second to no prince living.

* * * * *

And whereas the fame of the noblest Conquerors that ever were is onely renewed by history, your maiesty shall not onely haue your share thereof, but also for evermore, once every 3 or 6 yeares at the most, fill the eyes of the world with new and chaunge of matter, wherby all sortes of Studentes shalbe alwaies put in minde of Queene Elizabethes Achademy. And in the mean tyme, the pervsing of the old, and expectacion for the new, shall occupy Continually euery mannes tounge with Queene Elizabethes fame. So that your maiesty, being deade, shall make your sepulchre for ever in the mowthes of the livinge.

* * * * *

To conclude, by erecting this Achademie, there shalbe heareafter, in effecte, no gentleman within this Realme but good for some what, Wheareas now the most parte of them are good for nothinge. And yet therby the Cowrte shall not onely be greatly encreased with gallant gentlemen, but also with men of vertue, wherby your Maiesties and Successors cowrtes shalbe for ever, in steade of a Nurserie of Idlenes, become a most noble Achademy of Chiuallric pollicy and philosophie, to your greate fame. And better it is to haue Renowme among the good sorte, then to be lorde over the whole world. ffor so shall your Maiesty make your self to live among men for ever (whereas all

flesh hath but small continuaunce), and therwithall bringe youre selfe into goddes favour, so farre as the benefittes of good workes may prevaile.

Taking into consideration the disparaging references to Oxford and Cambridge, it is not improbable that Gilbert was led to propose his scheme by a desire to find a remedy to correct the deficiencies of these Universities, which were most marked in his time. If that is the case, his estimate is amply confirmed by recent writers on the conditions in the Elizabethan period. Emphasis has been laid on the University " intellectual insignificance " which then existed as the outcome of the Royal Injunctions of 1535 issued by Thomas Cromwell.

Ignoring the legends (common to both these Universities) about their beginnings, we may accept the statement that King Alfred founded, on Grammar School lines, an Academy at Oxford, which almost certainly was the origin of the University, that did not take anything like its present form till some centuries later. We should bear in mind that for a long period this Association of Scholars was under monastic and Papal regulations. This state of things was also similar at Cambridge till Reformation times.

It is possible that the visits of Elizabeth to Oxford and Cambridge had something to do with questions connected with Gilbert's 1570 Scheme. In 1571 Robert Dudley, Chancellor, was responsible for incorporating " the Chancellor, Masters, and Scholars," and for his influence for intensifying the strong position of Puritanism. In the same year Elizabeth granted a Charter for the foundation of Jesus College in Oxford. Subscription to the Act of Supremacy and Uniformity was imposed in her reign, during which Parliament passed an Act conferring economic and domestic advantages on both Universities, foreshadowing some of the Food difficulties of the present day.

Gilbert did not foresee the advantages which were to

result from bringing together the students of all the Colleges to discuss questions of far-reaching importance. The "Unions" of Oxford and Cambridge were not founded till the early part of last century, and these combine the objects of Literary Club and Debating Society. London University is now contemplating the formation of such an institution for its students. (See *The Observer*, London, March 21st and 28th, 1920.)

SOME CONSIDERATIONS ON THE APPLICATIONS OF PHYSIOLOGY TO MEDICINE.

BY

G. A. BUCKMASTER,

Professor of Physiology in the University of Bristol.

KNOWLEDGE has been likened by Montaigne to the settling of wine. The sediment collected at the bottom represents that which has separated out as accepted truth from that which is in process by clarifying, while the scum at the top represents that doubtful stuff which may never be of any use at all. This simile is peculiarly applicable to the process which is at work in those subjects termed by W. K. Clifford the inexact as contrasted with the exact sciences. Among the former physiology would undoubtedly be included.

For many years I have held that just as there are applications of chemistry or mathematics to technical subjects, so have I believed that this was possible for physiology. Responsible for the introduction of the term applied physiology, by which I understand the physiological behaviour of human beings which must stand in some sort of relation to pathology and medicine, if this science is really to justify the demands it makes on the student, I have

always maintained that the teaching of human physiology should be entrusted to those with a sufficiently catholic taste to realise that, although the phenomena of life in the widest sense are exhibited by all living organisms, a branch of physiology exists in which our interests are more centred upon the exhibition of these phenomena by the human being than by the sea-anemone, earthworm or frog.

Simple explanations are often preferable to wild theories as to the causation of phenomena, and this is particularly well seen when our attention is given to the factors which influence the interchange of fluid between blood and tissue spaces. The work of F. H. Scott affords a complete explanation of the undoubted rise in hæmoglobin and corpuscular content of the blood at high levels.

More than twenty-five years ago, in 1893 and 1894, C. T. Dent, C. Slater and myself during the summer months attempted to decide whether the polycythæmia which occurs at high levels is real or apparent. Our observations were made during residence at various places of known elevation above the sea-level, one of which necessitated a stay for five days in the Vallot hut on Mont Blanc (14,600 feet). It is unnecessary to describe our work in full detail, beyond stating that all the blood-counts were made in the following manner. Paired counting chambers were used for each determination. A whole field of the microscope containing 64 squares was photographed so that the count could be made at leisure. Observations were rejected where the paired counts varied more than 10 per cent. We found that the polycythæmia by high levels is established rapidly, indeed within twelve hours. Both the corpuscles and hæmoglobin contents augment in the same degree. On descent to the sea-level, the corpuscular content and hæmoglobin per centage fall almost to the normal value within thirty-six hours.

A consideration of F. H. Scott's paper explains, I believe, this apparent increase of corpuscles and hæmoglobin-content at high levels. He has completely disposed of two statements which are met with not infrequently. He finds that the hæmoglobin content of the blood in the capillaries is identical with that in the blood of the carotid artery, and his experimental evidence is conclusive in establishing the fact that the body does not contain masses of corpuscles stored away in various organs, such as the spleen or liver, which are liberated into the general circulation in times of stress, such as would occur, for example, after hemorrhage. He shows that the essential factor which causes an interchange of fluid between the blood and tissue-spaces is the arterial blood-pressure.

In all experiments, such as those in which the animal struggled, the early stages of asphyxia, adrenalin effects, and so on where the blood-pressure rises within four or five minutes, the hæmoglobin and corpuscular content perceptibly augment, conversely without exception in all conditions in which the arterial pressure falls the hæmoglobin value falls.

There can be little doubt but that these results can only be explained by the increased pressure forcing fluid out of the blood in the capillary districts into the tissue-spaces, and the passage of fluid back from the tissue-spaces into the blood when the pressure is lowered.

Is the blood-pressure raised at high levels? If so, there is a complete explanation of the early polycythæmia which is a physiological fact related to this, and one which there is no need to account for by the hypothesis that an increase of hæmoglobin is an adjustment for the diminished tension of oxygen. The answer to this question varies, some observers finding an increase in the arterial pressure, while others find none. There is, however, uniform agreement that the pulse-rate is greater at high than low levels; and

this persists even after acclimatisation, though with this the arterial pressure is stated to be practically unaltered. All individuals, no matter what the extent of exercise, exhibit in response to this, respiratory and circulatory changes of the same order as at a low level, but in a greater degree. Since this is the case, the slightest exercise or even standing on one's feet would be followed by a rise of pressure exceeding that at the sea-level. We may believe that it is the rise in arterial pressure, which Scott's experiments have so clearly shown to affect the corpuscular and hæmoglobin content, that gives a rational explanation of the polycythæmia of high levels.

The relation of the pulse-rate to exercise is well known, but in 1909 Miss F. Buchanan discovered an absolutely unknown feature of this accelerated rate.

She was the first to show that in man the pulse quickens at the very commencement of voluntary exercise. The first diastolic period in the cardiac cycle is shortened at once. During the next few seconds acceleration of the pulse proceeds, becoming greater and reaching a steady level within two minutes, which is maintained so long as the muscles continue at work. Observations on seven different subjects show the extent of this change in the pulse-rate :—

Resting.	After commencement of work.					
	Sec. 0.5	Sec. 2.0	Sec. 10.0	Sec. 20.0	Min. 1–2	Min. 5–7
42	74	84	90	105	120	120–127
55	67	80	96	100	100	115
58	78	88	100	100	140	150
60	72	75	84	88	102	100
64	72	80	90	90	100	101
68	100	106	120	124	138	138
72	90	96	105	108	110	120

This immediate acceleration of the pulse in voluntary movement is due entirely to loss of the normal inhibitory effect of the vagus on the heart. Should the heart quicken from loss of vagal tone, this is shown by shortening of the diastolic period alone, the duration of the systole remains constant. Should the heart quicken from the augmentor effect of the sympathetic, then the time-relations of both systole and diastole are shortened. Since it has been shown by Krogh and Lindhard in 1913 that this initial quickening of the pulse is absent when the limbs are passively moved, we may conclude that the promptness with which the pulse accelerates at the commencement of voluntary exercise is due to impulses which spread from the motor areas of the cortex to the vagus centre. The initial acceleration is therefore purely psychical in origin, but doubtless other causes, such as an outflow of impulses via the accelerator nerves and the rise of temperature during exercise, contribute to the maintenance of an increased cardiac rate during exercise.

The prevailing conception of the capillary circulation among physiologists and pathologists appears to be that the capillaries are passive channels along which the blood is flowing continuously through all of them at rates which are determined by the state of contraction or dilatation of the pre-capillary arterioles. The accuracy of this view has recently been questioned by a number of observers. In two papers, " On the number and distribution of capillaries in muscles," and on " The supply of oxygen to the tissues and the regulation of the capillary circulation," August Krogh, of Copenhagen, has reviewed the existing experimental evidence and brought forward his own results, which show that the capillaries are not merely passively dilated by the blood-pressure, but that they constantly perform active changes in calibre. It cannot be assumed that the capillaries

possess elasticity, and there is no evidence that this is the case. But the protoplasmic tube of living cells can conceivably actively dilate or constrict so as to obliterate its lumen ; in other words, react to stimuli which cause maximal contraction. On removal of the stimulus a relaxation to a mean position may occur, and would correspond to a state of capillary tone, and this feature would be a property of the capillaries themselves, and not one connected with any influence of a nervous system, such as is known to occur for the voluntary muscles, nor am I aware of any histological observations which would favour this idea.

It would seem that in the resting muscles most of the capillaries are in a state of contraction and closed to the passage of blood, but by throwing these into activity, or by gentle massage, a large number of capillaries are opened up. With cessation of these procedures the capillaries can be observed to close again. It is, of course, a matter of considerable difficulty to reach a high degree of accuracy by direct observation of the capillary circulation, but it seems certain that not only do channels which were invisible suddenly come into view, but the bore of individual capillaries is constantly changing, and this quite independently of the blood-pressure. On the assumption that the methods employed are reliable for deciding the variations in the capillary circulation of resting and active muscles, the following figures illustrate the differences. Stimulation of the sartorius shows 305 and 340 open capillaries per square millimetre respectively, the resting muscle showing 85, 96 and 100 per millimetre. The amount of blood which can be present in the capillaries of muscle is not less than 700 times the minimal quantity. The hyperæmic condition of any organ is due to a large number of capillaries being open and more or less dilated. In the anæmic condition most of the capillaries are closed, and most of those which

remain open are more or less contracted. From the teleological point of view clearly the variations in the capillary bed of active muscles is related to the requirements of these organs for the supply of oxygen and removal of metabolites.

Among experiments which are inadequate to elicit the truth, even though these are carried out with the tonic of self-criticism, I have selected one which is given with much detail by Lister. In what was destined to be the last of his addresses he draws attention to the misleading views which even still exist as to the microscopical appearances of the initial stages of inflammation. Having repeated these, it is possible with some degree of assurance to hold views which are at variance with the current statements given in text-books, copied as these often are from one to another. To quote Lister's own words: " He[1] had never experimented on a perfectly healthy state of the circulation, but had described with great accuracy what could occur only under morbid conditions. For I afterwards learned that the normal temperature of man is deadly to the cold-blooded frog. That animal, which under ordinary conditions exhibits very remarkable persistence of vitality, even after somatic death, is killed by being held for about a quarter of an hour in the hand; and if one of its hind feet be similarly warmed the blood-corpuscles will be found packed and stagnant in the vessels of the webs, as if mustard or any other powerful irritant had been applied to them. If on the other hand, in securing the frog for observation under the microscope, scrupulous care was taken to avoid needless exposure of the foot to the warmth of the hands, the threads for fixing the toes being held with long forceps, and each half of the knot tied separately, with a fair interval between them; a state of the circulation was seen which is, I believe, even to this day rarely witnessed. The white corpuscles, instead

[1] *i.e.* Wharton Jones.

of trailing more or less sluggishly along the walls of the venous radicles—the normal condition, according to some modern text-books—move freely along among the red discs, there being diffused through a due proportion of liquor sanguinis, the vessels present a pallor which would surprise anyone who had seen only the ordinary demonstrations of the circulation."

The nature and behaviour of hæmoglobin has ever been a subject of fascination to physiologists, and if we consider that in a sense the complicated processes of the higher animals have been built up around this body, it is not a matter for wonder why this is so. No known chemical substance among the half-million carbon compounds known to chemists possesses the properties of hæmoglobin. We are ignorant of its mode of formation either in the embryo or the adult, but by this statement I do not mean that many theories as to its formation do not exist. It is well known that after severe loss of blood, for example during post-hemorrhagic anæmia, the corpuscular content is more rapidly regained than is the normal hæmoglobin content of the corpuscles so that the colour index of the corpuscles is reduced, the blood in this respect resembling cases of chlorosis. For my part I can think of no place where this diminution in hæmoglobin content for each corpuscle can ultimately be made good except in the medium in which the corpuscles float; moreover, it is now known that a many-sided exchange takes place between the constituents of the plasma and corpuscles.

Crystals of hæmochromogen—the reduced alkaline hæmatin of some text-books—are as easy to prepare as hæmin crystals. Beautiful rose-coloured prisms can be prepared, and photographs of these from different animals are shown upon the screen. I find that solutions of hæmochromogen may be prepared of a high degree of purity by the solution of hæmin crystals in hydrazin hydrate. With

such solutions it is found that though hæmochromogen is the coloured iron-containing moiety of hæmoglobin, this substance in its relation to oxygen resembles hæmocyanin, the bluish copper-coloured pigment in the octopus and king-crabs. Both hæmochromogen and hæmocyanin behave not like hæmoglobin, but like calcium carbonate or reducible dye-stuffs like indigo or malachite green, which exist in an oxidised or reduced form. Just as hæmocyanin when oxidised is blue, so hæmochromogen when oxidised to hæmatin is brown; but these oxidised forms do not give off any oxygen to a vacuum nor dissociate under reduced oxygen pressure. Only chemical oxidising and reducing substances are active, and then these pigments are completely oxidised or completely reduced, features which sharply differentiate them from hæmoglobin.

J. A. Gardner and myself conclusively showed in 1906 that chloroform is carried not by the plasma but by the red corpuscles of the blood, though whether by the hæmoglobin or the stroma it is difficult to say. During the past five years I have attempted to ascertain the accuracy of the views which were independently held by Setchenow and Bohr on the function of hæmoglobin as a transporter of carbon dioxide in the blood. Can this gas be carried by this vehicle from the cells to the pulmonary capillaries? If this is the case, can hæmoglobin, apart from its accepted rôle as a transporter of oxygen, at the same time effect the carriage of carbon dioxide? This question involves several others, in particular the function of bicarbonate of sodium in the plasma and corpuscles. Considered by itself, bicarbonate cannot possibly lose any of its carbon dioxide at the lungs, for the pressure of this gas is so high in the alveoli of the lungs that any dissociation is out of the question. Solutions of sodium bicarbonate will not lose any gas at a pressure higher than 4 mm. of mercury, and that in the alveolar air

is ten times this value. The general teaching is that proteins act as weak acids—they must be stronger than carbon dioxide—and effect a liberation of this gas from bicarbonate. The whole matter rests on the accuracy or inaccuracy of this idea, and the difficulties of proof in either direction are considerable. It is, however, certain that the regulation of the reaction of the blood is a function of bicarbonate of sodium.

Since a healthy disbelief in, or at any rate a suspension of judgment upon current theories maintains our interest in scientific work, and compels the repetition of old experiments and the devising of new ones, a brief account of my recent work on the relations which obtain between hæmoglobin and carbon dioxide may be alluded to. When pure, salt-free hæmoglobin crystals go into solution in water it is found that the capacity of such solutions to hold carbon dioxide augments as the proportion of hæmoglobin augments. This pigment, therefore, enables quantities of this gas to be retained, and in amounts enormously in excess of what water alone, or a solution of other proteins in water can hold. When the calculations are made in the case of salt-free blood with the assumption that the blood proteins can absorb carbon dioxide to an extent equal to that of hæmoglobin—though this is not the case—then the following table shows that even with this admission, the blood pigment absorbs large amounts of carbon dioxide gas :—

Hb% in water.	Carbon dioxide absorbed by hæmoglobin in c.c. at 0° and 760 P.	1 gram Hb absorbs.
2.5	9.073	1.1
4.1	22.721	1.2
6.2	29.12	1.13
8.8	41.52	1.1
14.0	101.8	1.14
18.0	128.67	1.15

It is true that these figures do not prove that hæmoglobin actually does transport carbon dioxide in the body, but with the knowledge that the function of sodium bicarbonate does not appear to be that of a transporter of this gas these experiments have caused a renewed interest to be taken in this question. I have also demonstrated the essential fact that pure, unchanged solutions of hæmoglobin do not act in the sense of acids and bring about a liberation of carbon dioxide from bicarbonates, a view widely held and current in nearly all books.

The blood itself has always been a never-ending subject of research. "Oh yrkesome knowledge! Oh science full of molestation; that wasteth for us the sweetest houres of life," is a reflection by Montaigne well adapted to the minds of those in the past and present time who have attempted a study of this mysterious fluid. "Blut ist ein ganz besonderer Saft," says Mephistopheles, and so it is for us all. The proteins of the blood, regarded at one time as the source whence the cells of our bodies draw their nitrogen requirement, are now known not to serve the cells in this manner; these obtain nitrogen from the amino-acid content of the plasma, the proteins playing a humbler part in preventing a too rapid exit of water from the capillaries. As to the reaction of the blood, knowledge is becoming much more definite, and it is permissible to believe that the condition to which Naunyn in 1906 gave the name of acidosis will be restricted to those abnormal metabolic conditions in which β-hydroxybutyric acid and allied bodies are formed. The confused ideas of acidosis and experimental acid intoxication do not sufficiently differentiate these two forms of alteration in the character of the blood. In the sense in which Naunyn employed this term acidosis does not necessarily produce any effect at all on the acid-base balance of the body, and the bodies which cause acidosis, indicating

incomplete oxidation of fats or amino-acids, are significant of specific errors of metabolism, while acid-intoxications do actually reduce the bicarbonate reserve of the blood.

W. M. Bayliss and T. R. Parsons have both, though by different methods, shown how remarkably constant the reaction of our blood remains throughout life, and this is maintained by an adjustment of the loss of carbon dioxide by the lungs and of salts by the kidney. Strengths of acidity are expressed in various forms of notation, which indicate the hydrion concentration of acids in solution. The range of this compatible with life is exceedingly minute. Many common indicators used by chemists, such as phenol-phthalein, methyl-orange and methyl-red, change in tint at hydrogen-ion concentrations far outside the range of the blood. Neutral red, and the recent indicators brom-cresol purple and phenol red suggested for use by the Medical Research Committee, do change quite sharply between the values of 10^{-7} and 10^{-8}, the limits of hydrogen-ion concentration which are compatible with life according to the work of L. J. Henderson.

An old remark of Michael Foster's comes into one's mind n reflecting on the many-sided nature of the sciences of physiology and pathology: "In their methods, in their aims they are identical, and indeed a definitely united subject. As there is not a science of meteorology of good weather and another of bad weather, so there is not a separate science for the processes of health and another for those of disease."

THE MODERN TREATMENT OF TUBERCULOSIS OF THE SPINE.

BY

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UNTIL the past few years tuberculous caries of the spine has been one of the most tedious of diseases. There are considerable risks to life. According to some old authorities, about a third of the cases used to die within a few years of the onset. More recent figures are much more favourable in this respect, but the true mortality has still been as high as 5 or 10 per cent. Tubby followed ninety-nine cases for two and a half years, and of these twelve died. Even those who survive are apt to be delicate all their days.

In private practice, or at a special hospital such as Alton, better results can be obtained, and between 80 or 90 per cent. of those in whom treatment is undertaken early, in the pre-curvature stage, are likely under best conditions to make a good recovery. If town dwellers of the hospital class are included, the results are not nearly so good; probably in the past not more than half reach a stage of permanent comfort. In adults, particularly, it has been very unusual to see lasting good results.

The principal drawback of the disease, however, has been the tedious nature of its treatment. It is necessary that the patient should be kept absolutely recumbent, without once sitting up, for a prolonged period—six months for the cervical spine, eighteen months for the dorsal, and twelve months for the dorsi-lumbar (Fraser). Even these times

are not enough to ensure safety in the case of adults. After that some form of apparatus must be worn, probably for two years, and sometimes for longer. Seeing that at the end of this time the sufferer will probably be hunch-backed from long slow collapse of the centra of the vertebræ, it is not surprising that a tuberculous spine is regarded with feelings akin to despair by the patient and relatives.

One of the few blessings brought us by the war was the opportunity to meet and converse freely with some of the best American surgeons, who had come over to France and were temporarily attached to British hospitals there. One could therefore profit by the experience, not only of the brilliant and sometimes too sanguine inventors of new treatments, but also of the more cautious rank and file. I was greatly impressed by the glowing terms in which a number of them spoke of Albee's operation for tuberculous caries of the spine. One of them described it as "one of the most gratifying operations in surgery." I was therefore encouraged to make trial of the method, and so far have operated on five patients. Of these the fifth is still in hospital, and although he is doing well I shall not describe the case in detail.

The technique, very briefly, is as follows. By means of an electric cable saw, or an Albee saw, a graft about five or six inches long is cut from the subcutaneous surface of the tibia. If the crest is spared the bone is not weakened. Then the spines of five vertebræ, including the most prominent spine at the apex of the angular curvature, two above and two below, are split, not quite in the middle line, by the chisel, and a bed made for the graft to lie in. It is necessary sometimes to include a sixth spine. The graft is fixed by catgut sutures, uniting its periosteum with that of the fasciæ of the back, and as far as possible these fasciæ are brought over the graft to bury it.

In one of my cases it was necessary to bend the graft on account of the severity of the angular curvature. This bending is facilitated by four or five cross-cuts with the saw on the marrow surface of the graft, going half-way through it. The operation should not involve any particular degree of shock or bleeding.

The patient is kept absolutely recumbent on a bed with a pulley arrangement for raising him without rolling or sitting him up. At the end of two months a light plaster jacket is fitted, which is to be worn for about six months. As soon as the jacket is firmly set and dry the patient is allowed up.

As will be seen by the four case-reports appended, three patients have been restored by this treatment to a condition which, so far at any rate, may be described as a cure; they are able to get about freely and without pain, and there has been no increase of deformity beyond that which they had developed at the time of the operation. The fourth case is undoubtedly a great deal improved. Two of the four patients had been treated for years by other methods without success.

Indications and Contra-indications.—In view of the small risks of the operation and its many advantages, I am of opinion that it should be the routine treatment of all cases of tuberculous spine, unless contra-indications are present. These advantages are: (1) The great shortening in the time to be spent in bed—the period is reduced from twelve or eighteen months to two months; (2) the shortening of the time during which an apparatus or jacket must be worn; (3) the increased proportion of the cases who attain to a life of comfort, at any rate in patients of the hospital class—it is particularly amongst adults that this advantage is seen, because in them it is so difficult to obtain a lasting cure by recumbency; (4) the avoidance of any increase in the deformity.

The principal contra-indications are as follows: In children under the age of twelve the vertebral spines are so slender that it is difficult to split them properly, and the operation may fail. In the cervical region, at any age, the same difficulty prevails. If a dorsal abscess is present the graft might not unite. I have refused one case because there were two tuberculous foci in the spine, another because several bones and joints were also affected, and a third because paraplegia was present; but these are relative rather than absolute contra-indications. Albee himself recognises no contra-indications except sepsis.

Rationale of the Treatment.—The main agency by which healing may be obtained in a tuberculous bone is rest. When the disease is situated in the centra of one or more vertebræ this rest may be obtained effectually by prolonged and absolute recumbency, but when the patient gets about again the more or less perfectly recovered area is bound to be subjected to strain and pressure. Obviously such external support as may be afforded by a jacket, though it may protect against movements, cannot help much in taking off the pressure.

When the graft is introduced, and has become welded by firm bony union to the two vertebral spines above the apex of the angular deformity and to the two below, the five spines form one rigid mass quite capable of acting as an efficient splint. Aided by the articular processes and pedicles of the vertebræ, it can transmit the weight of the upper part of the body without involving the centra in any injurious pressure. They are further protected from such a degree of collapse as would exaggerate the hunch-back deformity.

Non-union of the graft seldom, if ever, occurs unless there is gross suppuration.

Treatment of Spinal Caries apart from Operation.—Some improvements have been made of late in the appliances

which may be used both during the period of recumbency and when the patient is up and about.

For the first period probably nothing is better than a Phelps box for young children and a spinal carriage for older children and adults. Where this latter cannot be obtained the Whitman frame presents great advantages. It consists of an oblong made of half-inch gas-piping, as wide as the patient's shoulders and eight inches longer than his height; over this frame canvas is stretched for him to lie upon, with a mackintosh beneath the buttocks. A canvas apron is tied over the patient to keep him from rolling off or sitting up. The advantages of this simple contrivance are that it can either lie on the bed or be carried into the garden, and that by bending the frame opposite the angular deformity some protection may be given against its increase.

When at the end of twelve or eighteen months the patient begins to get up he is apt to faint. Sir H. Gauvain has invented a tip-up carriage to be used at this stage, to accustom the sufferer to the semi-erect attitude by degrees before he leaves his couch.

When the period of recumbency has passed, and the time for getting about has arrived, the question of the most suitable spinal support arises. A well-applied plaster jacket, fitting snugly over the great trochanters, is efficient but very heavy. Better is Gauvain's celluloid substitute, impregnated with calcium chloride to render it non-inflammable. It is much lighter to wear, but it is a long, tedious business for the doctor or the nurse to prepare it.

Poroplastic and leather jackets save the doctor trouble, but are very little support for the patient's spine. A well-made Taylor brace, with a pelvic band and two paravertebral rods with a jacket fitted to them, is better. One or other of these supports should be worn for two years, and longer still if pain returns.

Cases of cervical caries are not very suitable for the Albee bone-graft, but fortunately they do not require so long a period of recumbency. Six months will usually suffice. During this time some means must be found to fix the head, either a weight extension or sandbags on either side. Only one very small pillow must be allowed.

When the patient gets up the best appliance is a plaster or celluloid jacket, either of the "Minerva" or the "fillet" type. In the "Minerva" the jacket fits over the trochanters and covers the abdomen, chest and shoulders, with arm-holes and an abdominal window; it then embraces the neck and takes the weight of the head, reaching as high up as a line drawn from the external occipital protuberance just below the ears to the point of the chin. This fixes the lower jaw and is awkward for eating. The "fillet" improves upon it by cutting away a piece under the chin sufficiently to free the jaw, and to compensate for this a band of plaster is carried from the external occipital protuberance around the forehead. These appliances are effective but not comfortable, and after six months may be replaced by a jury-mast attached to an ordinary plaster jacket, or a Taylor ring to support the occiput and chin attached to a Taylor brace.

Four Cases treated by Albee's Operation.

CASE 1.—H. H., boy, aged 12. Four months' history. For three months unable to walk on account of pain in the back and legs giving way. No actual paraplegia. Angular deformity, slight, in lower dorsal region. Skiagram shows blurring. Operation May 14th, 1918. Was running about in three months in comfort. At Christmas, 1919, was visiting the Infirmary free from pain and able to do anything.

CASE 2.—C. H., man, aged 36. Trouble dates from blow on back in 1914. Has been treated as out-patient and in-patient at Guy's and St. Thomas's, with rest in bed for long periods, and wore a poroplastic jacket. Still great pain and weakness. Marked angular deformity in lower dorsal region. Operation

October 15th, 1918. Was getting about without pain in three months, and greatly regretted that he had not had the operation long before. Seen by Dr. L. J. Short in January, 1920. Patient is of a grumbling type, and has phthisis. His back is firm and free from all but slight pain, and he can get about the house.

CASE 3.—C. M., man, aged 32. Seven years' history. In 1916 was treated by a year in bed, then got up with plaster jacket, followed by póroplastic jacket. Pain returned in 1918; by spring of 1919 was quite incapacitated, and cannot sit up without the jacket on. Angular deformity over 10th dorsal spine, moderate degree. Operation July 1st, 1919. Is now able to walk several miles with little or no pain; and has returned to work (as a tailor).

CASE 4.—S. C., man, aged 33. Slight symptoms for eighteen months, severe pain and disability for two months. Cannot walk more than a few yards. Angular deformity over 8th dorsal spine. Operation July 29th, 1919. Seen in February, 1920. Can walk ten miles, and is quite free from pain. Wearing a light plaster jacket still.

REFERENCE.

Albee, *Surg. Gynæ. and Obstet.*, 1914, vol. xviii. p. 699.

ON CASES OF ENCEPHALITIS LETHARGICA IN BRISTOL.

BY

D. S. DAVIES, J. O. SYMES, F. H. EDGEWORTH, I. WALKER HALL AND J. A. NIXON.

IN this paper an attempt is made to survey the general characteristics of the recently identified disease encephalitis lethargica, as manifested in the Bristol outbreak of 1919.

The paper is a composite one, and the various points of

view of the contributors serve to illustrate and define the salient features of the disease. Dr. D. S. Davies describes the disease in relation to questions of public health; Dr. Symes records a case in which, apparently, direct infection took place; Dr. Edgeworth contributes an analysis of the clinical features of the twenty cases reported, and following this is an account, by him and Dr. Walker Hall, of three cases which throw light on certain clinical and pathological aspects of the disease. Lastly, Dr. Nixon reports on a case occurring as far back as 1908, which, obscure at the time, can now be identified as one of lethargic encephalitis.

In the spring of 1918 the occurrence of an obscure disease, associated with progressive languor and muscular weakness, passing into lethargy and disablement, and with various cranial nerve affections, especially ptosis, strabismus and nystagmus, was noted in several centres of population, and a limited number of cases were reported in Bristol under the assumption that they were cases of "botulism," a rare food-poisoning condition originally described by Van Ermengem. There is little doubt, in the light of recent knowledge, that these were cases of encephalitis lethargica, and the year 1919 furnished further evidence of its existence.

During this year twenty cases were reported under this heading, and though the number is far too small to render any statistical conclusions accurate, it may be useful to consider them in detail, and to ascertain how far they agree with results observed elsewhere.

Sex Distribution.—Of the twenty cases eleven were males and nine females. This nearly resembles the ratio of males to females (3–2) observed in epidemics of *poliomyelitis;* the figures recorded for *encephalitis lethargica* are in the ratio of 68 males to 58 females.

Age Incidence.—

	M.	F.
0–10	3, 8, 9.	3.
10–25	14, 18, 21.	16, 16, 16, 16, 23.
25–35	31.	26, 29.
35–45	35, 41.	37.
45–55	48, 52.	
	11.	9.
	Total 20.	

Various ages from 3 to 52 furnished cases, ages under 35 yielding 76 per cent. and higher ages 24 per cent. of the total.

No cases were notified in infants under 1.

The marked incidence in females aged 16 is notable, and this age group 10–25 yielded no less than 42 per cent. of the cases.

Occupation and Social Status.—Nothing causally suggestive arises either from the occupations followed or the social position of the patients.

In the case of the laundry-maid employed at a General Hospital, no recent case had been nursed in the Hospital. This maid lived in Hospital, but her home address was in South Bristol, in a district from which no cases were reported.

Seasonal Incidence.—Colonel S. P. James found that most of the cases (126) he reported in England occurred during the seven weeks between March 16th and May 4th, the disease reaching its maximum prevalence somewhat

slowly, maintaining this prevalence for a comparatively brief period, and gradually declining.

The Bristol cases showed the following distribution, cases occurring regularly from December 18th, 1918, to May 19th, 1919, then after a four months' interval recommencing in October :—

1918. Dec.	1919. Jan.	Feb.	Mar.	April.	May.	June.
3	5	4	2	1	1	—

July.	Aug.	Sept.	Oct.	Nov.	Dec.
—	—	—	1	1	2

There is evidence only in one instance of limited power of infectivity, viz. the daughter (Case 10) who sickened sequentially to her father (Case 9). This is reported below by Dr. Symes. In all the other instances reported the cases are "sporadic," and bear no obvious relation to each other as regards occupation or association.

It appears, indeed, that encephalitis lethargica belongs to that group of maladies (including also cerebro-spinal fever and acute poliomyelitis) in which the pathological agent is more frequently present in the human organism than the clinical symptoms indicate. A manifestation of the disease occurs either as the result of a breakdown of the immunity to the effects of the virus, which the individual who harboured it had up to that time enjoyed, or as the result of a non-immune person becoming infected with a strain of the virus which has attained the degree of pathogenicity described as specific. In inter-epidemic periods both the conditions named are in favour of the

individual, thus clinical cases become very occasional or sporadic. The cases here reported were for the most part thinly scattered over various districts, working class or well-to-do.

The group of four (4, 14, 15, 16) occurred at irregular intervals from January to May, 1919, and afford no evidence of inter-communication. The group of 1 and 11 were also separated by an interval of a month. Twelve cases were removed to hospital: six cases to the Royal Infirmary, five to the General Hospital, one to Novers Hill Hospital. Of the nine fatal cases four died in hospital. The age and sex of the fatal cases are :—

Males.	*Death after Onset.*	*Females.*	*Death after Onset.*
3 years.	19 days.	3¾ years.	25 days.
8 ,,	14 ,,	16 ,,	10 ,,
9 ,,	14 ,,	23 ,,	22 ,,
14 ,,	3 ,,	26 ,,	3 ,,
18 ,,	12 weeks.		

D. S. D.

Multiple cases of encephalitis lethargica in the same house have been recorded but are not common, and a history of infection from direct contact with a sufferer from this disease is very seldom obtained. MacNalty reports the case of a pregnant woman who developed encephalitis. Labour was induced and a healthy child was born. "A few days later" the infant developed the disease. Both mother and child recovered. The same writer reports three cases in one family at Mansfield. The first patient, a female child aged 1¾ years, became ill with encephalitis on April 19th, her brother, aged nine, was attacked on May 4th, and a second brother, aged 7, on May 8th. Two of the children died. He also records two other cases, in one of which the incubation period was probably fourteen days and in the other sixteen days.

Reece reports a fatal case in a boy who was attacked on

May 19th, and died May 21st. His sister was attacked May 23rd, and died May 24th. Other cases quoted by Reece are: Man attacked December 7th, died January 19th—he was nursed by his wife, who sickened January 14th and died January 19th; a lady taken ill on December 5th was removed to a nursing home December 17th—her night nurse at the home developed encephalitis about December 26th or 27th.

The cases of encephalitis lethargica under my care which seem to throw some light on the subject of the incubation period are Nos. 9 and 10 of the series now reported. The father, who lived a few miles out of Bristol, after an indefinite illness at home, was removed to the General Hospital on February 5th, 1919, and found to be suffering from encephalitis lethargica. His daughter worked and lodged in Bristol, but visited her home and saw her father on the day of his removal to hospital. She complained of headache and tiredness on February 8th and 9th, but returned to her work on the 10th and 11th. The febrile attack started on February 12th, she was removed to the hospital on February 17th and died on the 20th. This would give an incubation period of seven days.

From a consideration of the foregoing it seems evident that, although the infectivity of encephalitis is a very low one, yet the disease is capable of transference from person to person; that it has a short incubation period of from four to seven days, but that the specific organism may lie latent for a much longer period in persons who are contacts.

J. O. S.

An analysis of the clinical features of the cases reported shows that in five cases the disease had been preceded by influenza, at intervals varying from some weeks to a few months. In view of the prevalence of influenza in Bristol

during the autumn and winter of 1918–19, these numbers do not suggest any causal connection between the two diseases.

Malaise and headache, generally unilateral, were the most common initial symptoms. In three cases vomiting occurred. Fever came on and lasted from a few days to three weeks, the patient becoming more and more lethargic, and often delirious at night. A rash appeared in three cases—urticarial, or macular, or papular. In only one case did the nervous symptoms consist solely of lethargy. In the other nineteen cases some affection of one or more cranial nerves appeared. In three cases nystagmus only was present, whilst in six cases there was some ocular paralysis, either unilateral or bilateral, varying from paresis of one muscle to total ophthalmoplegia. In eight cases some ocular muscle affection was accompanied by paresis or paralysis of the facial muscles, generally unilateral in distribution, more rarely bilateral. In one case a facial paresis, unaccompanied by any ocular affection, occurred. In two cases paralysis of the soft palate, associated with ocular and facial paresis, occurred. Aphasia was noted in three cases. In four cases the tendon jerks were lost, without any definite palsy. In one case paresis of the right arm and right leg occurred, with loss of the tendon jerks; this was the only case in which any definite polyneuritic phenomena appeared. Tremor, unilateral or bilateral, was present in three cases, and in one a general convulsion took place during the fever.

On comparison of these phenomena, observed in Bristol, with those described by MacNalty it would appear that all his types of the disease occurred, with one exception—no case of cerebellar ataxy was noted.

Nine of the twenty cases notified in Bristol died. This gives a mortality of 45 per cent. MacNalty found a mortality of 22 per cent. in 139 cases. The discrepancy of the Bristol

figures is probably due to the small number of cases; it can hardly be taken as indicating a more serious form of the disease in Bristol than that which occurred in London and the Midlands in 1918.

The diagnosis of the disease may be easy or difficult. It has to be remembered that, in the absence of lethargy, no cranial nerve paralysis can be regarded as evidence of its presence. Further, optic neuritis, retraction of the head and Kernig's phenomena must be excluded. If that can be done, as is easily possible, the majority of the pitfalls in diagnosis can be avoided. The most likely source of error is tuberculous meningitis.

F. H. E.

Frank M., aged 3, was admitted to the Royal Infirmary on January 4th, 1919, and died on January 12th, 1919. He had been brought to Bristol from London three months previously, had fallen ill on December 24th with headache and vomiting and subsequently became irritable. On December 30th he became drowsy, and then partially unconscious. On admission on January 3rd he was semi-comatose, with dilated pupils and incontinence of urine. The abdomen was scaphoid in shape, and the legs drawn up. Some erythematous maculæ were visible on the arms. He rolled his eyes about, but the right one less than the left. Kernig's sign and head-retraction were absent. The optic discs were normal. The cutaneous reflexes were normal, the knee-jerks absent. Spinal puncture showed a clear cerebro-spinal fluid, not under pressure. It contained a few cells, which on a differential count showed polymorphs 10 per cent., mononuclears 70 per cent., endothelials 20 per cent. It was sterile. On January 8th examination of the blood showed 10,320 white corpuscles per cb.mm. On January 9th left ophthalmoplegia developed, and on the following day left facial paralysis and nystagmus of the right eye. The temperature remained normal until the morning of January 12th, when it rose to 103.6 just before death.

The only *post-mortem* changes visible to the naked eye were congestion of the lower lobes of both lungs. On microscopical examination the cortex of the anterior and posterior lobes of the cerebrum showed general œdema and a few hemorrhages. There was a perivascular infiltration of a few blood-vessels by mononuclear cells. Here and there a capillary was thrombosed. The nerve-cells were unaffected, and no proliferation of the

neuroglia was found. In the floor of the 3rd and 4th ventricles, pons, medulla and spinal cord, the hemorrhages were more numerous and arranged superficially; the blood-vessels were more generally infiltrated by mononuclear cells, and around some there were definite foci of these cells. The tissue immediately underlying the floor exhibited a layer of mononuclear cells, and the perivascular tissues were thickly infiltrated. In the anterior horns of the cervical portion of the spinal cord were definite foci of mononuclear cells. The nuclei of occasional nerve cells showed shrinking and eccentric positions. Chromatolysis was not a general feature. No foci of proliferation of the neuroglia were seen. In the heart slight cloudy swelling and evidence of irritation of the perivascular tissues were visible. The lungs showed catarrh of the small bronchi and general œdema, the kidneys cloudy swelling, and the liver general fatty infiltration.

Ellen D., aged 16, was admitted on January 17th, 1919, and died January 21st, 1919. Her mother said that the girl had fallen ill one week previously with headache, and had subsequently become delirious. On admission the temperature was 102°, pulse 126, and respiration 24 per minute. She was lethargic and did not move spontaneously, except that she talked incoherently. Occasionally she answered questions, saying that she had pain in her neck and abdomen. The only abnormal physical sign, other than those recorded above, was lateral nystagmus of both eyes on looking to the right or left, which she did on request. Spinal puncture showed a clear cerebro-spinal fluid, not under pressure, containing hardly any cells, and sterile on culture. Examination of the blood showed 25,000 white corpuscles per cb.mm. On a differential count polymorphs 65 per cent., large lymphocytes 12 per cent., small lymphocytes 17 per cent., hyalines 3 per cent., and eosinophils 3 per cent. were found. On January 19th she was more comatose, and lay like a log in the bed. The temperature remained high until death on January 21st.

A *post-mortem* examination showed a marked turgescence of the superficial cortical veins, with some hemorrhages in the pia-arachnoid. Microscopical examination showed a few scattered minute hemorrhages, with perivascular infiltration of mononuclear cells in the cortex of anterior and posterior cerebral lobes. The nerve cells were unaffected, and no proliferation of the neuroglia was found. In the floor of the 3rd and 4th ventricles, pons, medulla and spinal cord there were numerous perivascular cell-infiltrations with occasional hemorrhages. Superficially there was a definite layer of mononuclear cells and irritated blood-vessels. The anterior horns of the cervical cord showed many mononuclear perivascular foci.

There was some diminution of nuclei and alteration of their position in the nerve cells. No proliferative foci of neuroglia were seen. In the heart there was evidence of considerable perivascular irritation, and cloudy swelling of the muscle cells. Some bronchiolitis and œdema were found in the lungs, fatty infiltration in the liver, and early catarrhal nephritis in the kidneys.

May R., aged 16, was admitted on January 21st, 1919, and went out well on March 17th, 1919. She had previously, in August, 1917, been a patient (of one of us) at the Infirmary with a rapidly-developed complete paraplegia, with no prominence of any vertebral spine, but with X-ray evidence of tuberculous disease of the lower dorsal vertebræ. With rest in bed and a plaster jacket she had recovered completely. About January 12th she complained of pain in the neck, and a little later became delirious, with incontinence of urine and fæces. On admission the temperature was 97°, pulse 96, and respiration 24 per minute. She lay motionless in bed, with mask-like face and closed eyes. She answered questions in an indistinct, slurred voice. There was no head retraction nor Kernig's sign. Both plantar reflexes were extensor in type, the left knee-jerk was active, while on the right side rectus and ankle-clonus could be elicited. [These abnormal signs in the legs were probably the remains of the paraplegia—evidence of some permanent structural damage to the pyramidal tracts, though the function had been completely restored.] She had opened her eyes on request. The pupils were equal and contracted. The optic discs were normal. Nystagmus was present in both eyes on lateral or vertical movement. Lumbar puncture showed a clear cerebro-spinal fluid, not under pressure; on centrifugalisation it showed a few cells, too few to count. 35,000 white corpuscles per c.mm. were found in the blood, and, on a differential count, polymorphs 70 per cent., small lymphocytes 17 per cent., large lymphocytes 9 per cent., hyalines 1 per cent. and eosinophils 3 per cent. were found. The patient became more lethargic, and a fortnight later no response was obtained on speaking to her. From that time onward she slowly improved. On February 23rd the nystagmus had disappeared, and she began to take notice of people in the ward. The number of leucocytes was 20,000 per c.mm. On March 13th they numbered 14,300. On March 17th she went home quite well.

MacNalty, in his most excellent Report to the Local Government Board on Lethargic Encephalitis, stated that it is "a general infectious disease characterised by

manifestations originating in the central nervous system, of which the most frequent and characteristic are progressive lethargy, and a lesion in or about the third pair of cranial nerves."

The three Bristol cases are of some interest in regard to the evidence they gave in support of this opinion, both in the widespread distribution of the lesions and in the occurrence of leucocytosis. From the increasing records of other cases and outbreaks it is becoming apparent that there is a wider distribution of the ætiological factor in the tissues. Marinesco mentions arachnoidal changes also, and Fairbourn describes the occurrence of a few cortical hemorrhages in his case. Tucker observed dilated cortical capillaries with slight aggregations of polynuclears in the perivascular spaces. Wegeforth and Ayer found occasional blood cells and granule-laden phagocytes in the spaces immediately surrounding the vessels in the cortex. The same authors state that there was some perivascular exudate in the cervical cord, a condition we noted in both our cases. Marinesco noted a patchy meningo-myelitis of the cervical cord in his cases. These findings are all in accord with MacNalty's type F of the disease, in which he considers there is evidence of spinal involvement. Confirmation of these facts is available from the experimental work of Lœwe, Hirschfield and Strauss. These workers obtained definite cortical changes in many of their experimental animals.

With regard to the other organs, Wegeforth and Ayer examined the heart, intestine and lungs in one case, but failed to find any perivascular changes. They state, however, that the affected vessels showed intimal proliferation. In both our cases the cardiac vessels exhibited perivascular changes, and the liver, lungs and kidneys presented morbid lesions.

It is perhaps worthy of recall that two of our cases showed

definite leucocytosis in the fourth and eighth day respectively, together with a slight relative increase in the lymphocytes. In one instance there was pyrexia, in the other the temperature was normal. This early leucocytosis is in accord with the findings in the American cases. It is now recognised that the white cells tend to decrease after the first week of the attack.

F. H. E., I. W. H.

In 1908 a boy came under my care at the Bristol Royal Infirmary whose case aroused much interest at the time. The patient was shown at the Bristol Medico-Chirurgical Society, and the diagnosis then agreed upon was "Polioencephalitis, with possible involvement of the cerebello-rubro-spinal tracts." No similar cases had been observed in the district.

The patient was a healthy, well-developed boy of seven, living in Bristol. He had had no previous illness except a mild attack of measles some years before. His parents were alive and well, with four other children all healthy. His illness began on September 28th, 1908, with vague malaise. On October 2nd he was admitted to the Bristol Royal Infirmary complaining of pain in the head, which he located over the left eye. It was said that he had been drowsy all the previous week. On the day before his admission he began to speak with a stutter. His left arm and his left leg seemed to become rigid. He had no fits or vomiting.

For a fortnight or more the boy lay in a lethargic condition, taking no notice of anyone. He answered no questions, but seemed to understand everything said to him. At first he took food with difficulty, but later nasal feeding was necessary as the teeth were kept tightly clenched. There was no head retraction, Kernig's sign was absent, knee-jerks present and fairly active, a Babinski reflex on the left side.

The pupils were unequal, the right being dilated. Nystagmus was present, but no optic neuritis. There was some loss of power in the left arm. The cerebro-spinal fluid was clear, with hardly a cell to be seen, and no organisms were found in smears or cultures. Lumbar puncture was performed three times. There was a moderate degree of pyrexia (100°–101° F.), the temperature fell by lysis and remained normal after October 16th.

By October 20th the boy's condition had become much worse. He lay perfectly still all day unable to take or swallow his feeds. He was rigid in all his limbs, with marked head retraction. On October 30th there was great improvement. He was able to understand when spoken to, had spoken and smiled. The rigidity was less marked.

After this time he slowly recovered, but it was noticed that he held his hands and fingers in a position suggesting the carpal spasm of tetany. This was not present in the feet. He also developed a constant tremor in the head and hands, much increased on voluntary movement. He gradually grew stronger. His mental and intellectual capacity appeared completely restored. Eventually the boy left the Infirmary in the condition of a case of well-marked "paralysis agitans," with shaking head, "cigarette-rolling" fingers, a forward stoop and rigid shuffling gait. There was excessive rigidity in all muscles. I have endeavoured to trace the boy and find out his present condition without success.

There seems no reason to doubt that this was a sporadic case of encephalitis lethargica. The characteristic triad of symptoms was present: fever, lethargy and lesion of cranial nerve nuclei or tracts in the brain-stem. The absence of optic neuritis and of Kernig's sign, together with the negative findings in the cerebro-spinal fluid, agree with our later observations on this disease. Recent observers have recorded other instances in which a condition resembling paralysis

agitans has occurred in non-fatal cases of encephalitis lethargica. I have at the present time a girl, aged 8, in the Royal Infirmary in whom the disease has run an almost identical course.

J. A. N.

MALARIA.

A discussion at a meeting of the Bristol Medico-Chirurgical Society on December 10th, 1919.

DR. D. S. DAVIES opened the discussion with a short statement of the Public Health (Pneumonia, Malaria, Dysentery, etc.,) Regulations, 1919, issued by the Ministry of Health, which provide that malaria is a notifiable disease (unless previously notified within six months), and place upon the Medical Officer of Health definite duties of investigation, precaution and supervision, so far as concerns observance by the patient of prescribed measures of treatment and necessary measures to prevent the spread of infection; also where rendered expedient by the occurrence of indigenous cases, of taking measures, with the assistance of the Ministry, for the destruction of mosquitos.

Dr. Davies next dealt with the distribution of malaria cases introduced into the United Kingdom, quoting Lieut.-Colonel S. P. James,[1] who in a recent communication to the Medical Society of London points out that since March and up to November 24th nearly 14,000 cases of malaria had been notified, and the rate of notification was being maintained. Cases of malaria are now distributed almost everywhere in England and Wales. From the point of view of treatment the most important cases are those in

[1] *Brit. M. J.*, Dec. 6th, 1919, p. 743.

which the treatment of an acute relapse has not been successful in preventing a fatal issue. The deaths ascribed to malaria numbered 86 in 1917 and 108 in 1918, and if the deaths are maintained will this year number 280. Unfortunately, very many of the deaths occur in young men in the prime of life. Colonel James points out that there was evidence that in at least some instances death might have been prevented if all medical practitioners in England and Wales had a sufficient knowledge of diagnosis and treatment of malaria. *The Suggestions for the Care of Malaria Patients*, prepared by Colonel Sir Ronald Ross and Lieut.-Colonel S. P. James, and issued by H.M. Stationery Office, deal with treatment and prevention in detail.

Dealing with the disease as it has affected Bristol :—

110 cases have been reported.

109 of these cases are ex-service men.

1 case, a woman, who contracted the disease some years ago when engaged in missionary work in Ceylon and Singapore.

3 cases have proved fatal.

Of the total cases notified 102 were reported by private medical practitioners since March, 1919, and 8 cases, pensioners, were reported by the Ministry of Health since November, 1919, who received information from the Local Medical Board.

Three fatal cases occurred : one contracted in Palestine in a man of 48, demobilised in March, 1919, died June, 1919 ; the second in a man of 43, a naval reservist stationed in Sierra Leone two years, invalided in September, 1916, under treatment at a local hospital, died June, 1919 ; the third a man of 21, from Salonika, died December, 1919.

Indigenous Cases.—The total number of cases of malaria contracted in England which have been discovered and notified since 1917 amounts to 414 (up to Nov. 24th, 1919).

Among these cases occurring in the civil population the great majority (75 per cent.) have been in children under 15. Some of the patients received quite inadequate quinine treatment, even after a definite diagnosis of malaria had been made. No indigenous cases have been reported in Bristol.

Although all demobilised soldiers suffering from malaria are entitled to receive treatment from an insurance practitioner, many who still suffer have not applied for treatment since they were demobilised. Consequently, the Ministry of Pensions have recently arranged to forward particulars of such cases to the Ministry of Health, who distribute the names to the Medical Officers of Health of the districts concerned. The number of reports now received by the Ministry averages 300 a week. Some of these neglected cases have communicated the disease to others, and it is obvious that prevention of the spread of malaria in this country is intimately bound up with arrangements for ensuring the satisfactory treatment of demobilised soldiers.

In 1917 and 1918 most of the sixty-seven indigenous cases of malaria occurred in North-East Kent, near the mouth of the Thames, and in general it is those districts formerly known to be malarious or which favour the presence and multiplication of the Anopheles mosquito in which danger is most to be feared. Three species of Anophelines are found in the British Isles: (1) A. Maculipennis, (2) A. Bifurcatus, (3) A. Plumbeus (nigripes), a comparatively rare species, but not uncommon in some districts; and of these the first two are known to be capable of transmitting the parasite of malaria. A. Maculipennis, to be recognised by its unbanded legs and palpi and its four spots in the field of the wing, but no spots on the upper margin, appears to be more common than A. Bifurcatus, possibly because as it frequents houses it

comes more under observation. It has been observed that Anophelines, though much commoner in the Fen districts and marshy ground as at New Romney, may be found anywhere where suitable conditions for the larvæ exist. Such conditions are generally not met with in the more densely-populated portions of large towns, but rather in the outskirts.

In order to deal with the threat of malaria recrudescence, especially in those districts in which the occurrence of indigenous cases has pointed to the effective presence of the malaria-transmitting mosquito, the Ministry of Pensions has recently instituted a malaria clinic in London and other places, through which the systematic examination and treatment of pensioned soldiers may be secured. Locally pensioners come within the purview of the War Pensions Committee and their medical referees, and some hospital accommodation is available for suitable cases, but no clinic has yet been established. The comparative paucity of effective mosquitoes in the district may promise immunity, but the records of Bristol shows how widely the home-coming reservoirs of potential infection are distributed in the city, and presumably also in the more dangerous rural surrounding areas, and this alone warrants an attitude of precaution. The chief danger is that a man whose disability is assessed by the Medical Pensions Board at *nil* retires into civil life and may neglect to apply to the local War Pensions Committee in the event of a relapse, as he should do in order to be examined by the Medical Referee. It behoves the Medical Officer of Health to maintain some surveillance over such men when they cease to be pensioners, and this is secured as far as possible.

Dr. S. KERFOOT, after giving a general survey of the various clinical manifestations of the disease as hitherto described, related some of his own interesting experiences amongst

malaria patients in the Near East. His remarks were as follows :—

I have seen catalepsy mistaken for malarial coma. I remember a patient who was sent to me from another hospital for treatment with galyl, after having had intravenous injections of quinine for supposed malarial coma, who on the first day of admission again became comatose. His previous hospital report showed that the malarial parasite had never been found, although repeated examinations of his blood were made, neither did his temperature chart show any definite attacks of fever. On admission in the morning, which was Sunday, I gave him an intramuscular injection of quinine as routine treatment ; but in the evening he was found by the sister of the ward to be comatose, and as I was away a colleague gave him an intravenous injection of quinine, when he regained consciousness, but the next morning he again became comatose. Such an unusual procedure put me on my guard, and on careful examination I found that he was in a cataleptic state. Hypnotic suggestion by a colleague and a firm hand procured a cure, and although he remained in hospital for another two months, and not one grain of quinine was administered during that time, yet he never again lapsed into his old ways or showed symptoms of malaria, nor was a parasite ever found in his blood.

Proceeding to the treatment of malaria, quinine when properly administered must be looked upon as a specific, and as a general rule any fever simulating malaria which resists quinine properly administered is not malaria, and some other disease must be looked for. An initial dose of calomel should always be given in the commencement of treatment of malaria, and aspirin relieves the headaches and the pains in the back and limbs, and promotes the sweating stage, and sponging and baths should be resorted

to for high temperature. Quinine when administered by the mouth should not be given in the form of tablets but in solution, and the bihydrochloride of quinine is much better borne by the stomach than the sulphate, and is for some reason more efficient, although more expensive, and it is readily soluble in water. Quinine administered for prophylaxis is entirely erroneous because it is not adequate treatment and keeps the malarial attacks in abeyance, killing most of the asexual forms of the parasite and rendering the sexual forms latent, so that the disease is not discovered until well established and the parasites immunised to quinine.

Now in the *benign tertian* form of malaria 15 grains of quinine three times a day should be administered by the mouth for one week, and 10 grains three times a day for two more weeks. This is generally sufficient, but in some resistant cases and in cases which show a one-day relapse every eight or ten days one or two intramuscular injections of 15 grains of quinine should be added to the treatment. Iron and arsenic should be administered in the convalescent stage.

In *quartan* malaria, which is much less common, the same method should be carried out as for the benign tertian. This form is more difficult to cure, but the attacks are not so severe.

In *malignant* malaria quinine by the mouth is totally inadequate, and 15 grains of the bihydrochloride of quinine intramuscularly should be given twice a day for one week, with a midday dose of 15 grains by the mouth, and 10 grains three times a day by the mouth for three more weeks, with one weekly injection of 15 grains intramuscularly. If any relapse occurs the same treatment should be repeated.

It is particularly in malignant malaria that we see pernicious symptoms, and for the more severe of these it is

necessary to give quinine intravenously. Twenty grains of the bihydrochloride should be given in about half a pint to a pint of sterile normal saline at body temperature twice a day for one, two or three days according to the severity of the attack, and then followed intramuscularly and by the mouth as in an ordinary malignant attack. In comatose cases I have known as much as 200 grains given in two days in three daily intravenous injections with excellent results and with no toxic symptoms to speak of. I believe I am correct in stating that no case of quinine amblyopia has occurred with a less dose than 120 grains. At least that was so in the Salonika area.

Then we meet the chronic relapsing cases with marked cachexia. These cases sometimes respond to quinine intramuscularly or intravenously, but it is for these cases, for those with profound anæmia and those with quinine idiosyncrasy that I would specially advise intravenous injections of galyl. Three injections (0.3 gm.) once a week for three weeks with quinine treatment in between (either by the mouth or intra-muscularly as considered necessary) is excellent treatment. The effect of the galyl on the blood corpuscles is most marked, and no other treatment would give like results in this respect, which is very important in a disease which is characterised by extreme destruction of the R.B.C. The patients in a few days take on a markedly healthier appearance. The sallow skin becomes bright and tinged with colour, and the patient feels immensely better. I will mention a few cases in which galyl was given. They had two weekly injections, and the second R.B.C. count was taken on the eighteenth day.

No. I.—Before the galyl: 1,290,000 reds with 20 per cent. hæmoglobin.

In eighteen days: 4,110,000 reds with 70 per cent. hæmoglobin.

No. II.—Before the galyl: 2,060,000 reds with 50 per cent. hæmoglobin.

In eighteen days: 4,370,000 reds with 70 per cent. hæmoglobin.

No. III.—Before the galyl: 2,170,000 reds with 55 per cent. hæmoglobin.

In eighteen days: 3,510,000 reds with 70 per cent. hæmoglobin.

Then the effect of galyl upon the parasite is also marked. The temperature falls almost immediately and the attack is terminated, whilst the sexual forms of the parasite, which probably were absent or few in the circulating blood, are turned out from the internal organs where they have been lying latent into the circulating blood in the same way as the trypanosome is turned out by atoxyl, and perhaps are induced to fertilise and split up by parthenogenesis into asexual forms, which are more readily killed by treatment, and then the parasites gradually disappear. I have given as many as eleven injections of 0.2 gm. to a man who had quinine idiosyncrasy and was almost moribund, and for whom galyl alone had to be depended upon as treatment, with excellent results. Salvarsan, kharsivan, phosphorated oil and sodium cacodylate, which is an unstable arsenical preparation, as injections, and other drugs by the mouth, such as methylene blue and other forms of arsenic have been tried with poor results.

Then we come to the transfusion of whole blood as treatment in serious cases where the hæmolysis is extreme and the R.B.C. count is down to 1,000,000 or even less, and many cases owed their lives to this treatment, as when the R.B.C. count has fallen so low the resistance to the parasite seems to have disappeared. Indirect transfusion must be used, as direct transfusion would mean infection for the donor. The blood of suitable donors must be tested with

the blood serum of the recipient for agglutination, since it has been found that only one out of three is suitable.

A spherical glass vessel is used of about two pints capacity with a vein cannula below and a tubed cork above. This is sterilised and coated on the inside with sterile paraffin wax to prevent coagulation of the blood. The cannula is inserted into the distal end of the slit vein of the donor by one surgeon and the blood allowed to rise by its own pressure into the vessel, which, when sufficiently filled—say about a pint and a half—is withdrawn and passed to another surgeon, who allows the blood to flow into the central end of the recipient's slit vein, helped by the pressure from an air-pump which is attached to the tube in the cork at the top of the vessel. A blood count the next day will show a rise of 500,000 to 1,000,000 reds, which gradually falls for two or three days, then remaining stationary, and finally the patient's own physiological efforts continue the increase.

Dr. CECIL CLARKE contributed the following remarks :—

There seems to be general agreement that the difficulties encountered in treating malaria acquired in Macedonia were greater than those met with in the case of malaria acquired in Mesopotamia. As a result of extensive trials, Sir Ronald Ross reported that no matter how big the dose of quinine or what route was chosen for its administration frequent relapses occurred, about 30 per cent.

An opportunity of comparing malaria acquired in East Africa with that of Macedonia presented itself in the early months of 1918. Units from both areas of warfare had arrived in France, and were to be examined both generally and by blood film examination as to their fitness for front line work and freedom from malarial infection. No parasites were found in the men from East Africa (twenty films), whereas 40 per cent. of the men who had served in Macedonia showed parasites, benign tertian in type, in the sixty films

examined. Despite continuous treatment with quinine, anæmia and enlargement of the spleen were present in varying degrees. The mortality rate for 1916 (January to November) was 1.0 per cent. In 114 fatal cases investigated 65 died within two days of admission to hospital.

Two observations in connection with the morbid anatomy of malignant malaria are worthy of mention.

1. The association of *acute cardiac failure or syncopal attacks* with fatty degeneration of the heart muscle. Of forty-five such tissues examined by Dudgeon and Clarke twenty-three showed a varying degree of fatty degeneration, well marked in eight and less so in fifteen. The microscopical appearances are indistinguishable from the fatty change seen in fatal diphtheria toxæmia. If it occurs in fatal pernicious malaria there is every reason to presume that it is present in the case that recovers. Even if limited or slight in a microscopical section it must represent a considerable fraction of the heart muscle. Its bearing on the immediate treatment of a relapse of fever is obvious.

2. The occurrence of hemorrhages into the lungs. The hemorrhages are usually limited in character but fairly wide in distribution; exceptionally massive consolidation of lung tissue results. These changes were present in twenty of thirty-three tissues microscopically examined. True lobular pneumonia was present in five cases and lobar pneumonia in one case; the hemorrhages afford a suggestive anatomical basis for a "malarial pneumonia."

Quartan infection was so extremely rare as to be negligible. Both in 1916 and 1917 primary infections of benign tertian were seen first in the last week of April and first week of May. Primary malignant tertian infections were not met with before the early days of June. The point was easy of determination in both years. In 1916 the majority of the troops had arrived in the latter months of 1915, and in 1917

there were many drafts who had not spent the previous summer in Macedonia. Willoughby and Cassidy state that at one camp where the predominant Anophelines were A. Pseudopictus and A. Superpictus the incidence of subtertian infection was very heavy. The other known carriers in the country were A. Maculipennis and A. Bifurcatus. Wenyon found that the carrier most commonly met with was A. Maculipennis, next in order of frequency came A. Superpictus.

Although it must be admitted that the administration of prophylactic quinine given with a view to preventing the development of malaria failed as a whole in Macedonia, it is possible to bring forward figures to show that the administration of quinine influenced favourably the amount of sickness. As regards the first point, Willoughby and Cassidy state: "From our experience we may say at once and emphatically that the prophylactic value of quinine in the doses given has been at all events so incomplete and questionable that none of the other precautions can for a moment be neglected in favour of such practice however universally it may be carried out." It may prevent the development of clinical malaria. A unit was stationed in July, 1916, in an area where the incidence of malaria was very high, and was moved in August to an area where primary cases of infection and mosquitoes were for the country infrequent. No case of malaria in the unit, varying from sixty to seventy in strength, was diagnosed microscopically until the months of January to March (the coldest months) when twenty-three cases occurred. Since arrival in the new area the unit had been taking 10 grs. daily in liquid form.

C. H. Treadgold[1] in a review of the whole question of

[1] C. H. Treadgold, "The Prophylactic Use of Quinine in Malaria," *Brit. M. J.*, May 11th, 1918.

prophylactic value of quinine in Macedonia considered that the general course of the disease may be adversely influenced by the previous taking of quinine.

The behaviour of the two parasites in the culture tube is distinctly different. Using what proved to be a method unfavourable in comparison with the original technique of Bass, Colonel Dudgeon and myself obtained a positive result in fourteen out of eighteen strains of the malignant parasite examined and a completely negative result with the benign tertian parasite in twelve cases. The serum employed was that of the patient, and, as Dr. Nierenstein has determined, the concentration of quinine in the serum attains a strength no greater than 0.8 gramme per litre whatever the dose given. The patients were with two exceptions being treated for malaria. The negative result in the benign tertian infections is perhaps to be assigned to the concentration of quinine in the culture tube. Repeating Bass's original technique, we found that the benign tertian parasite again failed to grow if the serum had been derived from a patient who had received more than 20 grains in the preceding twenty-four hours. This is in direct contrast to the behaviour of the malignant parasite. A strain derived from a patient who had been taking quinine daily for five months in doses of 10 grains and 40 grains in the preceding twenty-four hours developed typically and was followed for thirty-eight hours.

It is well known that the benign tertian parasite usually disappears from the peripheral blood in the twenty-four hours following a full dose of quinine. The effect of quinine on the sexual forms of this parasite was not so certain. C. H. Treadgold examined in the early months of 1917 125 men taking either quinine in doses of 30 grains daily to 15 to 30 grains bi-weekly or in twenty-six cases no quinine except during relapses. Sixty-five showed parasites in the

films and 90 per cent. gametes. Quinine has no ascertainable certain effect on the sexual forms of the malignant parasite. Its effect on the asexual forms was not so certain or so rapid as in the case of the benign tertian infection.

The mode of action of quinine still remains unknown, but in the culture tube it can be easily ascertained that the leucocytes can engulf and destroy full-grown parasites. Moreover, it is usual to find a complete disappearance of parasites if left in contact with serum and leucocytes for thirty-six hours or more.

Bass has shown that without the presence of dextrose in the serum of the culture tube, the strength at least 0.5 per cent., no development takes place. As is well known, the amount of dextrose in the circulating blood is practically a constant, 0.08 per cent. to 0.1 per cent. It has been shown that under conditions which cause fatigue the blood sugar may rise to a greater height than 0.1 per cent., and takes three to four hours to fall to its original level. The circulating dextrose is constantly being taken up and used by the muscles. Clinically, relapse is prone to occur after a long, tiring day, a spell of cold weather, in fact, anything which means extra muscular work. The life of the infantry in Macedonia provided many such opportunities, and relapse in a man recently returned from a convalescent camp was frequent.

It may be that the increased dextrose content of the blood, consequent on hard muscular exertion, plays some part in the pathology of a clinical relapse of malaria.

Lymphosarcoma of the tonsil, involving the palate, etc.

CASE OF LYMPHOSARCOMA OF THE TONSIL AND PALATE, &c.

BY

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THE value of a radical operation in even somewhat advanced cases of some malignant neoplasms of the tonsils and palate appears exemplified in the case illustrated; and as the desirability of undertaking an extensive operation has to be weighed against the risks involved and the palliative procedures that are open to us, such as injections of selenium or copper alynin, or removal by diathermy, the satisfactory result of a radical operation in this case seems worthy of record.

C. M., male, aged 36, came to the Royal Infirmary on April 24th, 1919, with a large sarcoma originating in the right tonsil and involving the soft palate and the palatal pillars on his right side. The glands in the neck below and behind the right lower jaw and beneath the sternomastoid were considerably enlarged. The patient declared that he had noticed the enlargement for five weeks only, but that it had increased very rapidly.

A portion of the growth was removed and referred to Professor Walker Hall, who reported that "the section shows extensive degeneration and hemorrhages. The connective tissue is very poorly developed. The greater mass of the tissue consists of atypical small cells. These approach the mother cells of lymphoid tissues in type. I regard the tissue as a *lymphosarcoma*."

Operation on May 20th.—The right external carotid artery was ligated and the enlarged glands in the neck carefully and completely removed.

May 27th.—The tonsillar growth, together with the palatal pillars, and the right half of the velum removed, including the uvula. The previous ligation of the external carotid artery rendered this operation almost bloodless.

March 23rd, 1920.—The patient has increased in weight and has no discomfort. There is no sign of recurrence in the throat or in the glands of the neck.

Progress of the Medical Sciences.

MEDICINE.

Cerebro-Spinal Meningitis.—A review of this disease in the light of recent additions to our knowledge.

Epidemiology.—The season of maximum prevalence is February–March, that of minimum prevalence August–September. The disease is not spread as a meningitis, what is spread is the meningococcus in the secretions of the nose and throat. The proportion of individuals so little resistant to the meningococcus as to develop meningitis is very low as compared with those who remain unaffected or develop only a minor illness (Parkes and Kenwood [1]). The prevalence of "colds" in the population appears to favour the outbreak of cerebro-spinal meningitis, but the "cases" need not have had colds or naso-pharyngitis (Rolleston [2]). "Carriers" do not often develop the disease, but they usually show the same type of meningococcus as the cases prevalent. A recrudescence of the disease shows great increase in the number of carriers, but non-contacts often show a higher carrier rate than those supposed to be contacts (Flack and Glover [3]). There are three possibilities to account for an individual case—

1. A "positive," *i.e.* a carrier, suddenly loses his resistance and develops infection of the cerebro-spinal system.

2. A "negative" becomes infected from an "exalted" strain derived directly from a case.

3. A "negative" becomes infected from a "positive," and instead of "carrying" the meningococcus he succumbs to cerebro-spinal meningitis.

As a practical point, it is clear that out of a large number of individuals isolated as carriers none will develop cerebro-spinal meningitis except perhaps as a rare exception (Fildes and Baker [4]). In an epidemic in Schwerin (1915–16) 10,000 examinations were made, and the "carriers" isolated. No carrier contracted cerebro-spinal meningitis. Soldiers from the front became carriers in a few days, but while the number of "carriers" increased the number of cases of meningitis diminished. The publication of this report was prohibited as contrary to accepted teaching and common knowledge (Much [5]).

Overcrowding is probably important, and Glover found a high carrier rate associated with overcrowding in sleeping quarters. Where the distance between the beds was increased the carrier rate fell in a few weeks from over 20 per cent. to the normal 5 per cent. (Gordon [6]). Yet Leishman [7] found that it was difficult to trace individual cases occurring in our armies in France to overcrowding, or to trace any connection between cases which were mostly sporadic. Cases of cerebro-spinal meningitis are not carriers *before* the onset, therefore they cannot have infected the contacts who are found positive *at* the onset. The " case " is as often as not free from cocci in the throat a short time after the onset, and, further, is seldom at any time so heavily infected or so persistent as an ordinary carrier. The declared " case " has very little to do with the propagation of cerebro-spinal meningitis, and is less likely to spread infection than a " carrier." The disease, then, is more or less an accidental by-product of a throat epidemic, during the course of which an occasional individual is found who succumbs to cerebro-spinal meningitis. A " case " occurs because in the vicinity of a susceptible individual there is a fairly high rate of positive carriers (Fildes and Baker [4]).

Bacteriology.—Gordon [6] has described four types which can be differentiated by agglutination and absorption tests. There is evidence of close relationship between Types I. and III. (Group A), and between II. and IV. (Group B). I. and IV. are the more highly specialised (in their agglutination reaction) of each pair. Group A corresponds with *meningococcus*, Group B with *para-meningococcus*. II. and IV. are commonest in the throat. I. and III. [8] which are less common, are more pathogenic, they only appear in epidemic numbers in the winter, fading out in the spring. It has been observed that Group A (I. and III.) favour the meninges; Group B (II. and IV.) cause septicæmia and extra-meningeal metastases. But Rolleston has seen Type II. give rise to severe meningitis. Before the war 96 per cent. of cases were Group A; during the war Group B became equally if not more common.

Treatment.—The following rules should be adhered to in regard to serotherapy:—

1. The diagnosis is made by lumbar puncture. If the fluid is turbid or under pressure give serum immediately of the prevailing type or polyvalent. The amount of serum should be equal to the amount of fluid withdrawn, not less than 20 c.c. The serum should be warmed to body temperature. After injection the foot of the bed should be raised.

2. The type of meningococcus should be determined and the appropriate serum given. Type II. serum contains less

anti-endotoxin than Type I., and should therefore be given twice a day.

3. Serum should be given at least daily till the danger is past. It should be repeated daily for four days whether improvement follows or not. It should be discontinued only when the temperature remains normal, and should be repeated on any recrudescence of temperature. The prospect of serum proving successful is materially diminished if its administration is not begun before the sixth day of illness.

Treatment of Carriers.—Gordon [6] advises the use of a steam atomiser (Levick's or Hine's pattern) with a solution of 1 per cent. zinc sulphate or 2 per cent. Chloramine. The sprayed air must be inhaled vigorously for five or ten minutes. Chronic carriers may be treated by applying Acriflavine (1 in 1,000) several times daily. Such cases should always be examined by a rhinologist for abnormalities of the nasal passages and accessory sinuses. It is impossible to estimate the real value of treatment in the cure of carriers, as it was found in the Navy that one-third of the carriers discovered amongst recruits became cured immediately upon entry, whatever the treatment applied to them.

Clinical Characters.—Rolleston [3] classifies the disease into two main groups: the systemic and the meningitic, with a further sub-division according to the clinical course. For comparison Rolleston's classification is shown below together with Osler's and Rose Bradford's. [8]

Rolleston.	*Osler.* [10]	*Rose Bradford.* [8]
1. Fulminating.	*a.* Malignant form (fulminating or apoplectic).	1. Meningitic (cerebral or spinal).
2. Ordinary acute.	*b.* Ordinary form.	2. Typhoidal or pneumonic.
3. Abortive.	*c.* Anomalous forms.	3. Anomalous symptoms.
4. Chronic.	1. Abortive type.	4. Resembling perfectly another disease, *e.g.* rubeola, rheumatism, myalgia, trench fever or nephritis.
5. Septicæmic.	2. Intermittent or pyæmic.	
6. Encysted or loculated meningitis.	3. Chronic.	

The general meningitic features may be summarised thus: intense headache, pain and stiffness in muscles especially those of the neck, head-retraction, fever, vomiting, delirium, and later coma. Positive Kernig's sign, strabismus and photophobia. Various rashes are met with: rose spots, papules and petechiæ. Herpes labialis is common (25 per cent. of cases). Foster [9] mentions two points of special importance in early diagnosis: Kernig's sign and retention of urine, or difficulty in micturition.

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[2] Rolleston, *Brit. M. J.*, 1919, i. 640 *et seq.*
[3] Flack and Glover, quoted by Gordon, *vide infra.*
[4] Fildes and Baker, *Med. Research Comm. Spec. Report Series.* No. 17.
[5] Much, *München. med. Wchnschr*, 1919, lxvi. 52; quoted in *Med. Suppl.*, 1919, ii. 182.
[6] Gordon, *Med. Bull. Am. Red Cross Soc. in France*, 1918, i. 342.
[7] Leishman, *Ibid.*, p. 350.
[8] Rose Bradford, *Ibid.*, p. 352.
[9] Foster, *Ibid.*, p. 346.
[10] Osler, *Principles and Practice of Medicine*, Eighth Edition, 1912.

J. A. NIXON.

SURGERY.

The treatment of cases of **traumatic arthritis** by active movements, as advocated by Willems, is a most important substitute for the time-honoured treatment by fixation of the joint, which in pre-war times led to such disastrous results. The writer had an opportunity of seeing many of Dr. Willems's cases in France, and it appeared strange to see patients whose joints were dripping with pus able to move them without difficulty and resulting ultimately in recovery with movable joints such as would not have been possible of attainment under former methods of treatment by immobilisation. A paper[1] by Drs. Clarence A. McWilliams, and William B. Hetzel on a "Report of 82 cases of knee-joint war injuries, with remarks on the Willems treatment by immediate closure and subsequent mobilisation, and the management of the subsequent infection by drainage and mobilisation," contains a clear enunciation of the methods by which Willems has obtained such excellent results.

General Principles of Willems's Treatment.—A preliminary X-ray examination of the joint is made to determine the degree of fracture, if any, and to indicate the position of any foreign body. At the operation all damaged tissue surrounding the wound superficial to the synovial membrane is removed. The instruments should then be changed or re-sterilised before the joint is opened up by the removal of the contused edges of the synovial wound. All foreign bodies, portions of clothing or detached fragments of bone should then be removed as quickly as possible, as exposure leads to dryness of the synovial membrane, and this predisposes to ankylosis. This part of the operation should be done without introducing even a gloved finger into the joint. The joint is then washed out with normal saline or other unirritating solution and the edges of the synovial

and capsular openings are completely closed with a continuous catgut suture, unless the effusion is distinctly purulent as in neglected cases. The external open wound is loosely packed with gauze wet with Dakin's solution or tubes may be placed in position for treatment by Carrel's method.[1]

No splint should be applied, and any bandage used should not be tight enough to interfere with subsequent movement. At the time the joint is open a culture of its contents is taken for bacteriological examination, and if hæmolytic streptococci are found the joint should at once be drained.

After-treatment.—As soon as the patient has recovered from the anæsthetic he is made to *actively* move the joint. If movement is begun thus early the pain is not great, as the periarticular structures have not had time to become infiltrated with inflammatory exudate. The nurse, upon whom much depends, should see that the patient moves the joint as much as he can without causing great pain every two hours night and day. Unless there are displaced bony fragments, when movements are contra-indicated, there is very little pain when active movements are commenced immediately after operation. It is not uncommon for a hemorrhagic effusion to take place into the joint, which should be aspirated in order to prevent any interference with the necessary movements.

In knee-joint cases the patient is made to get out of bed and to take a few steps on the joint without crutches, and almost perfect function is soon restored. It the joint contains pus, made evident either by signs of inflammation or bacteriological examination, thorough drainage must be effected by vertical external or internal incisions, and the joint washed out with Dakin's solution. Tubes are used if drainage appears inefficient, and then the internal ends should only just enter the synovial cavity. The after-treatment is the same as that already given—walking the day after operation without crutches, as the muscular contractions are most useful in causing the expulsion of pus from the joint. The drainage openings are sutured as soon as the discharge becomes serous.

The modifications of the treatment which have been described are as follows: (1) Where there is a bony lesion of middling severity, as in the detachment of an important fragment of an epiphysis. These are the oblique trans-condylar fractures, and there is a danger of the dislocation of the articular line. Immediate mobilisation should be begun, but in the knee walking should not be permitted for about three weeks, in order that sufficient consolidation may take place to prevent displacement of the fracture. (2) Where there are large bony fragments, as in the varieties of T-shaped fractures, the limb should be continuously extended, movements being

delayed in order that the articular line may be preserved by consolidation.

The authors desire to note the following summary of the rules which Dr. Willems [3] considers essential in carrying out his method :—

" Active mobilisation should be begun without any delay, and should be carried as far as the patient is in a condition to do it. It should be done without interruption even to the point of fatigue. This mobilisation is not painful in the true sense of the word, it is only laborious, and it is necessary to compel the patient to do it, to tease him if he is lacking in courage.

" It is never necessary to add passive movements to the active movements with the expectation of hastening the process.

" Patients treated by this method never present any serious alteration of their general condition, even during the early febrile period. They never look like those who have been severely infected. They do not fear movements as do those who are immobilised. Even in purulent arthritis it is striking to note that the joint has not the excessive sensibility which an infected joint presents when it is cared for by immobilisation."

* * * * *

Diverticulitis is assuming a clinical importance in much the same manner as appendicitis did about thirty years ago. Though known to the few, it has not yet found its way to most of the ordinary text-books, and it has until recently been regarded by the surgeon only from two aspects—as the chief cause of vesico-colic fistula, and as a cause of stenosis of the large bowel resembling malignant disease.

The name is not altogether satisfactory, as diverticula are congenital and acquired, and it is the congenital form with which most people are more familiar, but the acquired form which is affected in the condition under consideration. Dr. W. H. Maxwell Telling, who opened the discussion on this subject at a recent meeting of the Royal Society of Medicine, and whose remarks [4] are taken as the basis of this review, practically restricts the term " diverticulitis " to the " inflammatory changes and secondary pathologic processes generally occurring in or in connection with a certain type of diverticulum. This type is the secondary, acquired, multiple false diverticula of the large bowel, particularly and nearly always found in the sigmoid flexure." It should, however, be borne in mind that acquired diverticula may occur in any part of the alimentary tract. Acquired diverticula are most common after sixty years of age, and it is probable that constipation is an important factor in their production. As Dr. Telling points out, the diverticula are often overlooked because of their smallness,

because they mainly enter the fat-laden appendices epiploicæ, and are not discoverable without careful dissection.

Secondary Processes.—When once the diverticula have formed the subsequent results depend upon: (1) Being caused by pressure from within they may enlarge; (2) they may harbour fæcal matter or foreign bodies; (3) they tend to undergo secondary pathologic processes. The secondary processes are divided into two groups: A, mainly mechanical, and B, mainly inflammatory, but both forms may co-exist in the same case. A, mechanical: (1) Formation of fæcal concretions in the diverticula; (2) torsion of the diverticulum; (3) lodgment of foreign bodies in the diverticular sac; (4) perforation. B, inflammatory: (1) Diverticulitis (gangrenous, acute, subacute, chronic or latent); (2) passage of organisms without perforation; (3) peridiverticulitis—chronic proliferative inflammation with tendency to stenosis of the bowel; (4) perforation giving rise to general peritonitis, local abscess, fistula or suppuration in a hernial sac; (5) the formation of adhesions, especially to the small intestine, bladder and female pelvic organs; (6) local chronic peritonitis; (7) chronic mesenteritis of the sigmoid loop; (8) metastatic suppuration; (9) the secondary development of carcinoma.

Symptoms vary with the pathological condition, but the majority of cases conform to the following types: (1) Inflammatory trouble or tumour in the left lower quadrant of the abdomen; (2) general peritonitis; (3) vesico-colic fistula; (4) pelvic syndromes; (5) intestinal obstruction; (6) mimicry of carcinoma.

About 30 per cent. of cases are associated with tumour or abscess formation, and after thirty years of age the possibility of such swelling being due to diverticulitis should be considered. By far the largest group of cases occurs as a more or less acute inflammatory trouble in the left lower quadrant of the abdomen—analagous to appendicitis on the opposite side.

Diagnosis.—The condition which presents the greatest difficulty is the differentiation between carcinoma of the bowel and the peridiverticulitis which exists as a contracting tumour tending towards chronic intestinal obstruction. Even at the time of operation the diagnosis between these conditions may be impossible, but the following points Telling regards as being in favour of peridiverticulitis: (1) The absence of the "shadows of malignancy" from the general condition; (2) tendency to obesity, and maintenance of good nutrition generally; (3) long history of attacks of abdominal pain in the left lower quadrant; (4) history of tumour formation, with subsequent disappearance; (5) absence of blood (visible to naked eye) in stools over a prolonged period; (6) presence

of vesical fistula, in which malignancy can be excluded by cystoscopy; (7) negative sigmoidoscopy as regards malignant disease; (8) X-ray demonstration of diverticula; (9) pyrexial attacks; (10) examination of blood showing the presence of neutrophilic leucocytosis, and the absence of the specific nuclear changes characteristic of cancer. Sigmoiditis, hyperplastic tuberculosis, actinomycosis, syphilis and pelvic conditions generally may require consideration in forming a diagnosis.

Treatment is by operation unless there is some special contra-indication. All diverticulum-bearing gut should be removed, or recurrence may take place. There seems to be a special liability to post-operative peritonitis in some cases. Care should be taken in handling the gut, lest rupture of a diverticulum should occur. No case of supposed carcinoma of the lower bowel should in future be regarded as inoperable unless diverticulitis has been fully considered.

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[2] *Vide Bristol Medico-Chirurgical Journal*, 1917, xxxv. 68.
[3] *Brit. M. J.*, 1920, i. 82; *Lancet*, 1920, i. 85.
[4] *Ann. Surg.*, 1919, lxix. 221.

Reviews of Books.

Fevers in the Tropics. By Sir LEONARD ROGERS, I.M.S. Third Edition. Pp. xii. 160. London: Oxford Medical Publications. 1919. Price 30s. — In these days, when so many of us have seen something of tropical diseases or their effects, the appearance of the third edition of this book is of especial interest. The best chapters are those on kala azar, enteric fever, amœbic hepatitis, malaria and the fevers of short duration, which are the diseases of which the author can speak from very large experience. Of those diseases rare or unknown in Bengal he gives able summaries of the present state of our knowledge. The clinical and therapeutic sections are those most fully given and are generally admirable; pathology, excepting the blood state, receives less attention. We are somewhat mystified by the references to the infection of European men with kala azar through their relation to the daughters of the soil. If it is a fact that there is known "no instance in which a European

cohabited with an infected native woman and escaped kala azar," this is surely a very important epidemiological fact. The author does not suggest sexual intercourse as the cause of infection, but sees in it another fact to support the bed bug theory of kala azar, surely rather a strain on an unproved hypothesis. The paratyphoid fevers in India are treated somewhat superficially, and he even seems to doubt their specificity. We fancy if skilled bacteriological diagnosis was made available for the civil population in India the paratyphoid fevers would be proved to be commoner than the author imagines. As far as we can see from his method of diagnosis the paratyphoid infections would not be recognised. He recommends the agglutination test in a dilution of 1 in 100, and apparently to *B. typhosus* only. He gives the technique of blood culture, but does not give any results of this test in his own hands. If blood cultures were done in all early cases and stool and urine examinations in all later ones, and the blood serum put *up to titre to all three organisms* in non-inoculated patients, we should get more reliable results as to the incidence of the three types of infection. Some of the charts (*e.g.* those on p. 112) would do well for paratyphoid fever, and a Widal of 1 in 100 to *B. typhosus* might be a group reaction produced by a specific infection of Paratyphoid A. or B. The Diazo reaction, a very unreliable test, is given more prominence than it deserves, whereas Marris's atropine test is not referred to under enteric fevers, but is briefly mentioned under the diagnosis of infective jaundice (p. 168). "Infective jaundice, or *Spirochætosis icterohæmorragica*" is dealt with in some detail, but the author has made no clear distinction between it and the common camp jaundice. He refers to the Dardanelles outbreak as if it were probably spirochætal jaundice; but that epidemic was surely camp jaundice, similar to that which occurred in epidemic form in India and Mesopotamia, and was certainly not spirochætal jaundice in these two latter countries. We are told that infective jaundice (meaning presumably spirochætal jaundice) "has long been known to be widespread over the world, including India." We do not think this a correct statement for cases in which the presence of the spirochæte has been proved. The clinical picture of the two diseases is perfectly distinct, so is their pathology, but an inexperienced person reading this chapter would confuse the two. There is a short description of trench fever, though we doubt the justification for including this disease in a book on "Fever in the Tropics." The chapter on malaria is excellent and mirrors the author's great experience and the soundness of his conclusions. We note he has dropped the method he so strongly advocated of giving intravenous antimony injections in malignant tertian malaria, as he gives the barest reference

to the method. He has also merged the "Seven day fever," which he formerly described as a separate entity, into dengue fever, and here he follows general opinion. The chapter on these short fevers is clear and informative, though, as we suggested before, there is a probability of mild attacks of paratyphoid fever being responsible for some of these obscure pyrexias. Despite these and other slight imperfections in the book, we can recommend it to the physician in tropical countries as cordially as we have former editions. It is a monument of the author's ability and indefatigable industry, and such defects as it has are the defects of its qualities.

The "Nauheim" Treatment, in England, of Diseases of the Heart and Circulation. By LESLIE THORNE THORNE, M.D. Fifth Edition. Pp. vii., 160. London: Baillière, Tindall & Cox. 1918. Price 5s. net.—The Nauheim treatment as originally propounded consists of three parts, (1) graduated exercises, (2) baths, and (3) the Nauheim "atmosphere." The war has taught us the value of exercise as a prognostic test and as a therapeutic measure; at the same time it has cut us off from Nauheim and proved to us that the "atmosphere," *i.e.* optimism, can be cultivated anywhere by a physician who is determined to do so. What of the second? Perusal of Dr. Thorne Thorne's little book leaves us little room for doubt. The "Nauheim" baths do good, it is clear; whether more so than other and less expensive media of optimistic suggestion is not so clear. The whole thing works out to this, that the patient must be weaned from his fears, and so long as this is accomplished it does not much matter how. Dr. Thorne Thorne's book has reached a fifth edition, a fact that speaks for itself.

The Early Diagnosis of Tubercle. By CLIVE RIVIERE, M.D. Second Edition. Pp. xii., 314. London: Oxford Medical Publications. 1919. Price 10s. 6d. net.—The demand for a new edition of this work has given the author an opportunity for some revision and expansion, more especially in those sections devoted to physical signs, and for the addition of the writer's views on a little recognised condition known as hilus tuberculosis in the adult, on which little has yet been written. He very wisely holds that "a diagnosis of phthisis must always be, apart from the discovery of the tubercle bacillus, a matter of probability more or less great: according to the value and number of the various pieces of evidence collected together will the result come near to certainty." The physician has to ask himself in what particular direction does the evidence before him fall short, and then apply those tests which best supply the missing evidence. The book mainly consists of a description of those numerous tests on which a diagnosis of phthisis must

rest. The chapter on Hilus Tuberculosis (p. 91) is worthy of careful study. This is the common form of tuberculosis in childhood, when the disease starts in the root glands and creeps outward along the lymphatics surrounding the bronchi and vessels. In the adult the scars of these early disease processes are visible in the X-ray plate, but they occasion no symptoms and give rise to no physical signs. It is only when an exacerbation of disease occurs and gives rise to fresh symptoms and signs that the term hilus tuberculosis becomes admissible and necessary in the adult. The appreciation of the reflex bands of dulness associated with the author's name, and the lung reflex described by Abrams in 1903 (pp. 34–36) requires much training, and must often be matters of uncertainty requiring further evidence to give them value in diagnosis.

Pye's Surgical Handicraft. Edited by W. H. CLAYTON-GREENE, B.A., M.B., B.C. Eighth Edition. Pp. xvi., 639. Bristol: John Wright & Sons Ltd. 1919. 21s. net.—In this, the eighth edition of a well-known work, the process of revision and addition has produced a volume of 600 odd pages. There are signs that the present editor, realising that he was on hallowed ground in dealing with such a classic, hesitated to use the blue pencil when well he might. Who, for instance, in the last twenty years ever heard of a patient with strangulated hernia being treated by being immersed in a hot bath until he felt faint, the while taxis was applied? It seems a mistake to devote five pages to an account of the theory and technique of the Wassermann reaction, and only spare one for the treatment of gonorrhœa. It is wrong to say that the object of Janet's method is to *force* fluid into the bladder. It is rather to coax the sphincter to let the fluid pass, with the patient's active co-operation. In order to test the claim that the book has been brought up to date, the reader will turn to the section on war surgery. He will find the subject briefly but adequately treated; but we should have liked to find a reference to a late but most successful method of wound-treatment—delayed primary suture. We are glad to find a warning against haphazard removal of foreign bodies, unless they are causing or threatening trouble. The book contains a vast amount of information of use to those for whom it is written. It is well produced and indexed and, as a whole, illustrated, but the skiagrams are disappointing. It will, no doubt, continue to enjoy the favour it has deserved and received for more than a generation.

The Forms of Alcoholism and their Treatment. By HUGH WINGFIELD, M.A., M.D., B.C. (Cantab.). Pp. 76. London: Oxford Medical Publications. 1919. Price 5s. net.—The treatment of alcoholism is one of the medical practitioner's

most difficult problems. The failure of institutional treatment and the disappointing results obtained from the exhibition of drugs are generally agreed upon. In this brief work Dr. Wingfield shows that drug treatment in order to be effective and permanent should be supplemented by treatment by suggestion under light hypnosis. The chapters devoted to the classification of the various forms of alcoholism contain much that is fresh and interesting, and the author has succeeded in producing a work which, though the matter is compressed as much as possible, is full of most valuable help in the treatment of this condition.

Military Surgery. By DUNLOP PEARCE PENHALLOW, S.B., M.D., Major, Med. Res. Corps, U.S.A. With Introduction by Sir ALFRED KEOGH, K.C.B. Second Edition. Pp. xx., 555. London: Oxford Medical Publications. 1918. Price 21s. net. —The author of this excellent war manual has been working at military surgery in a large base hospital since the beginning of the war. The rapid exhaustion of the first edition is the best evidence of the appreciation which the book has received. The present edition attempts to give an account of the various theories and practices which have recently been introduced into the service of war surgery. Carrel's method, therefore, is fully described, and there are a number of new illustrations relating especially to the treatment of fractures. Perhaps the main drawback from which the author has suffered is the fact that he has not had the opportunity of dealing with either the earliest or the latest phases of gun-shot injuries, and the book is somewhat lacking both in respect of the casualty clearing station organisation and also with regard to the problems of reconstructive surgery. The illustrations in their number and variety give a good idea of typical war wounds, but as a manual of instruction it would gain greatly by the addition of diagrams and clear teaching about such practical matters as the treatment of fractures. The book is a fine evidence of the author's energy and systematic work during the stress of an active campaign, and it will probably remain as a most useful book of reference.

The Operative Treatment of Chronic Intestinal Stasis. By Sir W. ARBUTHNOT LANE, Bart., C.B. Fourth Edition. Pp. xii., 328. London: Oxford Medical Publications. 20s. net.— The previous editions of this book have been widely read. In the present volume little more than one-third is from the pen of the illustrious surgeon whose name appears on the title-page; the remaining chapters are contributed by an anatomist, a pathologist, a bacteriologist, a physician, a skiagraphist, a cardiac specialist, a gynæcologist, an eye-surgeon, a blood specialist, and a dentist, so far-reaching are the effects of the

condition claimed to be! However, even if we are not yet convinced that the large intestine and the ileal kink are the root of all evil, it is undoubtedly true that chronic intestinal stasis is a common and important disease, and it is really necessary for every doctor to make himself acquainted with the signs and symptoms and available means of treatment. Only in this book is the subject fully presented, and if read in a properly critical spirit it is of fundamental value. It is possible to admit this much without being a very enthusiastic advocate of the operation called colectomy.

On Cancer of the Tongue. The Bradshaw Lecture of 1918. By D'ARCY POWER, M.A., M.B. Oxon., F.R.C.S. Pp. 21. Bristol: John Wright & Sons Ltd. 1919.—The Lecture opens with an interesting account of the literary history of cancer of the tongue, from which it appears that the first definite notice of the disease the writer has been able to find is that in some chirurgical lectures to the United Company of Barber Surgeons in 1635—two hundred and eighty-four years ago. Next the zoological distribution of the disease is considered, for it occurs in many vertebrate animals, though in domesticated animals it is very rare, and has not apparently increased in frequency. The subject is next approached from the statistical side. The increase in the death rate from cancer of the tongue is shown to have been great since 1868—the rate has more than trebled in the male sex. Statistics before 1868 are not available. Finally, an estimate of the effect of various possible causative factors is given, concluding a very interesting survey of the subject.

Back Injuries and their Significance under the Workmen's Compensation and other Acts. By ARCHIBALD MCKENDRICK, F.R.C.S.E. Pp. viii., 173. Edinburgh: E. & S. Livingstone. 1916. Price 2s. 6d. net.—As the title of this little book indicates, it has been designed to assist medical and legal examiners in drawing correct conclusions as to the nature, degree of severity, and prognosis in back injuries, specially of the less severe forms of such injuries, in which there is often much difficulty in "estimating the true value of the subjective symptoms in the comparative absence of physical signs." The mechanical, dynamical, anatomical and physiological considerations bearing on the subject of back injuries are thoroughly considered and instructions given on the best methods of examining and reporting on them for legal or other purposes. The writer's observations on X-ray work in this branch of surgery are particularly valuable, for his experience has been very large. We consider that the book fulfils well the purposes for which it has been written, and will prove helpful to all readers who have

to deal with the back injuries of those claiming compensation under various legal enactments.

Bipp Treatment of War Wounds. By RUTHERFORD MORISON. Pp. vi., 72. London: Oxford War Primers. 1918. Price 2s. 6d. net.—In this little book the author of this method of treatment gives a full account of the technique, with illustrative cases. He lays stress on the fact that to be successful in the use of it the surgeon needs to be careful rather than clever, and here he probably explains the differences of opinion of those who have made use of it. Many surgeons are enthusiastic advocates, some see little virtue in it and no small danger from poisoning from iodoform or bismuth. The truth, doubtless, lies somewhere between the two extremes, and any surgeon who follows the author's directions with care will certainly find that it can produce remarkable results. Anyone who wishes to make or renew acquaintance with the technique will find all the guidance he requires in this little monograph.

Burns and their Treatment. By J. M. H. MACLEOD, M.D., F.R.C.P. Pp. xvi., 160. London: Oxford War Primers. 1918.—One of the last of the Oxford War Primers, and one of the best books on the subject which we have seen. It deals with burns especially from an ætiological point of view, and gives the treatment of the various varieties of burns in detail. The open method of treatment and that by the paraffins are discussed fully. The last chapter is devoted to dermatitis from high explosives, and represents all the most recent work on the subject. The book is well illustrated, and can be recommended to all readers interested in the subject.

Gymnastic Treatment for Joint and Muscle Disabilities. By Brevet-Col. H. E. DEANE, R.A.M.C. Pp. 146. London: Oxford Medical Publications. 1918. Price 5s. net.—This manual gives a clear and concise account of the value of a well-equipped gymnasium in the treatment of the disabilities arising from the war. The Indian club, vertical rope, parallel bars, sparred plank, beam and wall bars are clearly described, with exercises suitable in each case. The illustrations are clear. Stress is placed upon the advantage of active muscular exercises compared with the passive movements so commonly employed; also upon the absence of the monotony liable to be associated with elaborate and expensive machines. The book is permeated with the enthusiasm so necessary for successful treatment in this type of disability.

A Medical Field Service Handbook. By C. MAX PAGE, M.S., F.R.C.S. Pp. xiv., 159. London: Oxford War Primers. 1919. Price 6s. net.—A vast amount of practical advice has been compressed into a small space in this manual. It is

divided into two sections, the first half dealing with general diseases, the second half with wounds. Under the treatment for hemorrhage the statement that intravenous gum solution gives almost as good results as blood transfusion is open to criticism. The chief value of the book is for the medical officer undertaking field service. It is unfortunate that it was not available for use at an early period of the war.

Surgical Applied Anatomy. By Sir FREDERICK TREVES, Bart, G.C.V.O., C.B. Seventh Edition. Revised by ARTHUR KEITH, M.D., and W. COLIN MACKENZIE, M.D. Pp. x., 702. London: Cassell & Co. Limited. 1918. Price 10s. 6d. net.—We are very pleased to welcome another edition of this valuable manual, which has been thoroughly revised and again brought up to date. A further addition of sixteen coloured illustrations and considerable additions in " orthopædic anatomy " enhance the value of the book. Important points are more clearly emphasised in the text by a much freer use of heavy type in the printing. The new anatomical nomenclature has been added in brackets side by side with the old.

National Health: from Magic, Mystery, and Medicine to a National Health Service. By FERDINAND REES, M.D. Pp. 68. Bristol: John Wright & Sons Ltd. 1919. Price 1s. 6d. net.—This is an interesting discussion of some of the problems in the reorganisation of medicine at the present time. The writer is a warm advocate of a national health service on the lines of an improved national health insurance. He is deeply impressed with the evil effects of competition for practice amongst doctors, and thinks that higher aims and greater efficiency in the struggle against disease could be obtained in a well-organised public service. Though he seems to minimise the immense advance in public spirit and practice actually realised during the individualist system of private practice, and to regard the voluntary hospitals as entirely out of date, his criticisms are suggestive and often very valuable. The book is eminently readable, but the problems are too complex to be fairly discussed in the sixty-eight pages he devotes to them.

The Indian Operation of Couching for Cataract. By ROBERT HENRY ELLIOT, M.D., B.S. Pp. xii., 94. London: H. K. Lewis & Co. Ltd. 1917. Price 7s. 6d. net.—We have a three-fold addition to medicine in this volume. First, a fascinating bit of history of the ancient and modern Oriental custom of operating for cataract by depressing the lens, incidentally giving a vivid picture of the ignorant and superstitious Eastern mind. At the same time as much credit as possible is given to the operators for doing what they truly believe to be the

best for their patients. Second, a painstaking monograph on the pathology and results of this operation in a series of over 750 cases, including 54 excised globes, showing in excellent plates the various conditions which have followed this crude and septic operation. Twenty-five years had been spent in collecting this material. Statistics show carefully and fairly that scarcely 10 per cent. have better vision than 6/18. 30 per cent. show iritis and irido-cyclitis, and another 10 per cent. consecutive glaucoma. Third, prevention. The appalling results as compared with extraction cannot fail to influence those responsible for the health of the natives, and will assuredly bear fruit in combating superstition, and thus saving the sight of thousands a year in a large portion of our empire.

Practical Vaccine Treatment for the General Practitioner. By R. W. ALLEN, M.A., M.D. Pp. xii., 308. London: H. K. Lewis & Co. 1919. Price 10s. 6d.—One feels in reading this book that it contains a special pleading—in places almost more than special—and yet as the arguments are unfolded and the experiences are aggregated there comes an understanding of its necessity. Vaccine therapy has been over-boomed, misapplied, cast aside, all without rhyme or reason. The temperamentally conservative shunned it or abused it; the opposite nature used it without discretion—perhaps without sufficient knowledge. Manufacturers hailed it as a godsend for their balance sheets; retailers dispensed its medicaments over the counter. The bacteriologist treated it with the utmost caution, shuddering often at the attempts of amateur vaccinists and wondering about the possibilities which might befall the vaccine or the patient. So runs the script for practitioner, consultant and pathologist. Plain fare for all. Collect specimens properly. If you cannot, call in a bacteriologist, or, preferably, a vaccine therapist. Make opportunities for bringing the pathologist to the patient. Watch your patient day by day after each injection. Associate the course of injection with thought and observation, not with rules of thumb. Shun stock vaccines unless it is impossible to obtain others. Differentiate between sera and vaccines. These are some of the impressions left after perusal. Yet the dogmatism, insistence and personality of the book will be forgiven when it is realised how hard is the fight for efficiency and scientific accuracy. The author hopes that he will be accorded the right to be included within the category of the last line of an old Persian proverb, which says, "He who knows and knows that he knows is a wise man, follow him." His pathway takes us through a chapter on toxins and antibodies, along the narrow track leading to the collection of material and the preparation of vaccines, down

the broad road to the rocky whirlpool of prophylactics and therapeutics. All the systemic diseases are treated in turn, and the volume closes with a series of questions from practitioners and answers by the expert. There is a good index. The book is for all to read and re-read, partly as an exercise in separating wheat from chaff, or again, as stimulus to thought, contentious or otherwise, and finally as a chastisement with scorpions for our sins of omission or commission.

A Manual of Elementary Zoology. By L. A. BORRADAILE, M.A. Second Edition. Pp. xii., 616. London: Henry Frowde and Hodder & Stoughton. 1918. Price 16s. net.—This new edition presents various difficulties which in our opinion could easily have been avoided. If the book is an elementary text-book especially for medical students, the author ought not to assume any knowledge of physics and chemistry, and consequently ought to treat more fully such questions as respiration, digestion, excretion and the physical laws determining division, growth and surface area in relation to cubical content. Again, it would lead to a much better conception of zoology if one could advance from simple to complex along reasonably natural lines, and the subject-matter were rearranged, the systematic part commencing with Amæba. One or two minor faults creep in, while a few of the old favourites still retain their place. Why is it necessary to refer to the internal opening of the vas deferens in the earthworm as the "sperm rosette"? To us this seems just an unnecessary addition to terms in a subject already overburdened with them. There is a curious misstatement in reference to *Filaria bancrofti* on page 304, and a slip has occurred in the diagram of the cranial nerves of the skate. We are not sure that the long appendix on practical work is really needed, and even if so the diagram of a compound microscope might have been replaced by that of a more modern type of instrument. The book is, however, well written and illustrated with a large number of excellent diagrams.

Diseases of the Throat, Nose and Ear. By W. G. PORTER, M.B., B.Sc., F.R.C.S. Ed. Third Edition. Revised and edited by A. LOGAN TURNER, M.D., F.R.C.S. Ed. Pp. xv., 30. Illustrated. Bristol: John Wright & Sons Ltd. Price 12s. 6d. net.—We extend a warm welcome to the third edition of this very practical, sound and scientific epitome of the essentials of diseases of the throat, nose and ear, which so well fulfils the main object of the writer, to provide the practitioner and senior student with a moderate-sized hand-book. The earlier editions were deservedly well received. This, the third, has been improved by the revision of the section on vestibular tests, the amplification of the section

on nerve deafness and otosclerosis by Dr. J. S. Fraser, and other contributions by Dr. Douglas Guthrie and Dr. Gardiner. These colleagues have joined with Dr. Logan Turner in revising the text-book of the author, whose death in action during the war

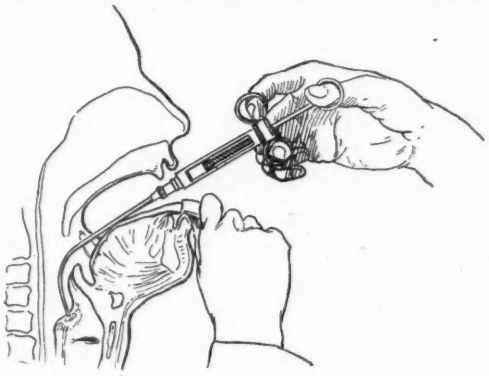

FIG. 12, p. 45.

is a grave loss to British oto-laryngology. The illustrations are very good and numerous, and the publishers may be congratulated on the general excellence of the printing and production of the work. By the courtesy of the publishers we are enabled to reproduce one of the illustrations.

An Introduction to General Physiology, with Practical Exercises. By W. M. BAYLISS, M.A., D.Sc., F.R.S. Pp. viii., 238. London: Longmans, Green & Co. 1919. Price 7s. 6d. net.—*The Principles of General Physiology*, published in 1914 by Professor Bayliss, beyond question marks an epoch in British physiology. We must go back to 1876, the year of publication of *Foster's Text-book of Physiology*, to find a parallel to the interest aroused by the appearance of Bayliss's work.

The present volume of about 240 pages is essentially an elementary exposition of the subject on the lines of his larger treatise. Whatever may have been the opinions held as to the part which physical chemistry was to play in the investigation of physiological processes, it is now certain, as a perusal of this book shows, that marked progress has been accomplished by the application of the methods of physical chemistry to physiological studies. The publication of this book is in itself a proof of this statement. The treatment of the subject is clear; that it is somewhat dogmatic cannot be held as a fault. The requirements of no particular examination have been taken into consideration and in this lies much of the scientific excellence

of the book. It is not burdened with many illustrations, for Professor Bayliss holds, and in this the majority of teachers will agree, that a picture which attempts to represent what a part of a living organism actually looks like is less instructive than a diagram which frankly attempts no more than to indicate what is essential to the working of the mechanism. In Fig. 4, p. 109, a diagram of the possible mechanism of the organ of Corti may be noticed, also the methods for measuring the degree of electrolytic dissociation on pages 173–175. The whole book,—Part I., The Text, and Part II., Laboratory Work—is original in conception, and may be cordially recommended for perusal, not only by students, for whom it has primarily been written, but by all interested in the modern trend of physiology.

War Wounds of the Lung. By PIERRE DUVAL. Authorised English Translation. Bristol: John Wright & Sons Ltd. 1918. Pp. viii., 99. Price 8s. 6d. net.—In no province of treatment have our ideas been more completely revolutionised by the experience gained in the war than in that which concerns gunshot injuries of the lungs and pleura, and to no one more than to Pierre Duval has this startling change been due. The volume of which the present work is an excellent and painstaking translation was originally published in 1917, but before its appearance Duval's methods and opinions had gained considerable notoriety among British medical officers in France, and much new and valuable work had been carried out by them on lines similar to his, if not always identical. The principle of non-interference in wounds of the chest was a tradition from the South African War, and was "official" at the beginning of the Great War in 1914. The development, however, of well-equipped operating stations close behind the firing-line, and the enthusiasm and skill of good surgeons, rendered possible the innovations which find their expression in this book. The two great dangers which threaten a man wounded in the chest are early death from collapse or hemorrhage, and, later, the occurrence of severe and hardly less fatal septic infection. These two dangers it has been the work of the surgeons to prevent, by early treatment of an operative character. The earlier dangers have been met by operations for arresting hemorrhage at its source and for closing the thorax where a large open wound had produced collapse of the lung, and its attendant shock with embarrassment of respiration. The later danger, that of sepsis, has been met by the operation of thoracotomy, done as soon as circumstances permitted, with a complete toilet of the pleura, removal of damaged tissues and in many cases of shell fragments embedded in the lung itself.

The results cannot really be adequately appreciated by statistics, although Duval gives some striking figures. The

success of the modern methods depends so much on the circumstances of warfare and the skill and experience of the medical officers concerned, that the only real evidence of their value is that afforded by those who have actually watched them and assisted in carrying them out.

This book is, for all its modest proportions, a classic of the war; its English dress suits it admirably; and we commend it to all who are interested in the progress of surgery as a model of what a monograph dealing with original work should be. It will appeal, moreover, not only to surgeons but to physicians, for the subject is one in which both are equally concerned. The best results have always been obtained by close collaboration between the two branches of the healing art, a fact which is eloquently expressed in the author's dedication to his colleagues of the Auto-Chir, No. 21.

Surgical Operations: A Text-book for Nurses. By E. W. Hey Groves, M.D., M.S., F.R.C.S. Pp. viii., 255. London: Oxford Medical Publications. 1919. Price 21s. net.—The author of this volume has already won universal renown among medical students of all ranks by his *Synopsis of Surgery*, and the same success is certain for this companion work for the nursing profession whose desire is to understand the processes of operations and the why and wherefore of the surgeon's needs.

The book opens with a chapter describing the most up-to-date aseptic and antiseptic preparations for surgical operations, and is a fine, clear appeal to the surgical conscience. There follows a series of chapters outlining all the common operations, both minor and major, which is remarkable for its concise context, and the inclusion of the tested advances that remain out of the vast research in wound surgery that the recent war has afforded. But undoubtedly the supreme merit of this work lies in the profusion of most animated and illuminating sketches of the various fields of operation to which the text alludes.

This very up-to-date addition to medical literature concludes with an illustrated catalogue of the essential instruments of surgical handicraft, which is a genuine boon, and a fitting close to a picturesque as well as scientific survey of operative surgery.

The clearness of the type and illustrations are a great tribute to the publishers.

Encyclopædia Medica. Second Edition. Vol. vi. Pp. viii., 658. Edinburgh: Wm. Green & Son. 1919.—Another volume of this great work is on similar lines both as regards author, revisers and subjects. Thirty-four authors write special articles on subjects ranging from H to I under the general editorship of Dr. J. W. Ballantyne, who is himself the author of one of these. An article of one hundred pages on Insanity is included by the late much-lamented Dr. C. A. Mercier, whose voluminous

writings on Psychology and kindred topics will long be remembered. In commenting on the treatment of insanity he emphasises the necessity for the reduction of function of the supreme regions of the nervous system, and he adds the remark that "if every insane person is to receive what is humorously termed hospital treatment—that is to say, is to be kept in bed—the treatment is not consistent unless he is also relieved by a catheter and fed with a stomach-pump." It is greatly to be regretted that we shall have no further output from Dr. Mercier's active brain and facile pen.

A Guide to Gynæcology in General Practice. By COMYNS BERKELEY, M.A., M.D., M.C., and VICTOR BONNEY, M.S., M.D. Second Edition. Pp. xxiii., 467. London: Oxford Medical Publications. 1919. Price 31s. 6d. net.—This book has been written expressly for the general practitioner, and no operative procedures or pathological details are included in the subject-matter, the general arrangement of which is somewhat unusual.

Part I. is devoted to a description of the various methods of abdominal and vaginal examination. In it the authors advocate the semi-supine as the position of election for bimanual vaginal examinations. It certainly has the advantage that it entails less exposure of the patient, but inasmuch as it does not procure such complete relaxation of the abdominal muscles as the lithotomy position, it can hardly be considered so satisfactory.

Part II. deals with the significance of symptoms at considerable length, the section on abdomino-pelvic pain being particularly useful.

Part III. is occupied with the interpretation of physical signs. This is dealt with in an exhaustive and comprehensive manner, and should be of considerable assistance in the diagnosis of obscure pelvic lesions.

Part IV. describes the various methods of treatment, including those by radium and X-rays. In it the authors express themselves as somewhat adverse to the use of the pessary. There is, however, no doubt that these instruments still have a fairly wide field of usefulness, more especially in general practice, many women still being unwilling to submit to operation if their symptoms can be relieved by wearing a pessary. The authors lay much stress, and rightly so, on the importance of early exploration of the uterus in cases of irregular or continuous uterine hemorrhage.

The fifth, and last, part contains a concise account of the medico-legal aspects of gynæcology. This should enhance the value of the book. The text is illustrated by a number of clear and useful figures, and the book ought to be of great assistance to the general practitioner in dealing with the gynæcological cases which he meets in his practice.

Editorial Notes.

Proposed Amalgamation of Bristol Hospitals.

For some considerable time a scheme has been under consideration to amalgamate or co-ordinate the chief voluntary hospitals and other medical charities of the City of Bristol, and by May 31st these various institutions will be invited to pass such resolutions as may be necessary to the attainment of this end. The decision on this great question involves great issues, and if it proves a success the event will be historic in British hospital work.

We understand that the following Institutions are to be invited to co-operate in the amalgamation: The Bristol Royal Infirmary, Bristol General Hospital, Royal Hospital for Sick Children and Women, Bristol Eye Hospital, The Convalescent Home, The Bristol Dispensary, Cossham Hospital, The Orthopædic Hospital, and the Cripples' Home and the Eye Dispensary. Those of the above electing to come into the scheme will be represented on a General Council, which shall be the central authority, presumably to co-ordinate the financial and general management of the Institutions.

The situation which has arisen in the financial state of the British Voluntary Hospitals, and which has to be reckoned with, is one of the misfortunes of the great war, for although the ever-growing needs of these hospitals created difficulties before the war, philanthropy devised means of overcoming those difficulties. And now that these difficulties have been magnified a hundredfold owing to the enormously increased numbers of those for whom treatment in hospitals has become

essential and the diminished ratio of those who have hitherto supported the hospitals, many are tempted to lose heart, and join in the cry that the voluntary hospitals are doomed, although the general excellence which characterises the work they do has inspired such widespread confidence that they have become an essential part of our national life, and by the force of example have compelled a raising in the standard of all collateral State relief. Hence the stand taken by the President of the Bristol General Hospital, Mr. George A. Wills, is encouraging and timely, for he urges that the city memorial to those who have fallen in defence of the country should be the raising of a sum which shall place the voluntary hospitals on a sound financial footing. But when we consider that the preservation of the voluntary hospitals is not only a great financial problem, but involves also the equally important question of developing the teaching and training of medical practitioners and the evolution of British medicine and surgery in the soundest, most scientific manner, the responsibility of those who manage these institutions cannot end with the collection of even the enormous amount of money which will serve to remove outstanding debt and maintain them for the immediate future. Great commercial concerns demonstrate the imperative need for amalgamations and co-ordinations to save overlapping, administrative expense and impoverishing competition. But hospitals as we know them are not commercial concerns, and just as the most distinguished scientists are often the most unbusinesslike, so with hospitals, once the commercial instinct becomes the dominant factor in their work its value and attraction will dwindle, they might as well be State institutions. Yet this, to our mind, is the strongest argument for the effort now being made by those who seek to save the voluntary hospitals by bringing to bear on their business aspects the experience and

organising skill of those who think imperially. The difficulty is to devise a method of re-organising the voluntary hospital system without sacrificing the initiative and the enthusiasm of the individual institutions.

Patients' Contributions to Hospitals.

Hitherto, in alluding to the crisis in the voluntary hospital system and the projected amalgamation in Bristol, we have made no allusion to the obvious fact that while the voluntary contributions of the charitable public are inadequate to maintain the increasing need for hospital accommodation, a new factor has come into existence, viz. the very large percentage of those who, when requiring hospital treatment, are well able to contribute at least a part of the cost of their maintenance. It is not right or reasonable to ask the philanthropic to pay for those who can provide for themselves, the majority of even relatively poor hospital patients would gladly contribute according to their means, and in this way hospitals already receive very considerable help in meeting their expenses.

Paying Hospitals.

A very urgent matter for consideration is the provision of hospital accommodation for the very large class of patients who are unable to pay the necessarily heavy charges of private nursing homes and the cost of pathological investigation, X-rays, etc., etc., in addition to medical or surgical fees, and yet are not so poor as to be proper inmates of a charitable institution. Their lot is a hard one, for on the one hand they ought not to take advantage of the hospital accommodation provided for those who are less well off, and on the other hand they often find it impossible to incur the necessary expense involved in their own homes or in private homes. We want in Bristol a paying hospital somewhat on the lines of St. Chad's in Birmingham, where the net cost of maintenance and treatment is immensely reduced by

having a large number of patients, and where the fees of the medical staff are on a reduced scale. St. Chad's Hospital is maintained by the payments of the patients, and it has proved a highly successful means of filling the gap to which we direct attention. The existing hospitals cannot provide adequately for the class of patient we now refer to, seeing that they cannot even meet the requirements of the proper hospital class. A separate hospital in this city on the lines of St. Chad's would be a great boon ; but although the necessity for such an institution has long been recognised, nothing hitherto has been done to provide it, and it is high time that the matter was brought to a practical issue.

The Library of the Bristol Medico-Chirurgical Society.

The following donations have been received since the publication of the list in December, 1919.

10th March, 1920.

C. W. J. Brasher, M.D. (1) .. .. .. 29 volumes.
L. M. Griffiths (2) .. .. 6 volumes.
Medical Research Committee (3) .. .. .. 9 volumes.

Unbound periodicals have been presented by Drs. J. M. Fortescue-Brickdale, J. O. Symes, W. K. Wills, C. H. Walker and Mr. J. Taylor.

NINETY-NINTH LIST OF BOOKS.

The figures in brackets refer to the figures after the names of the donors, and show by whom the volumes were presented. The books to which no such figures are attached have either been bought from the Library Fund, or received through the *Journal*.

Accessory Food Factors, Report on .. .. (3) 1919
Aitchison, R. S. .. *A Medical Handbook* .. .. .. 5th Ed. 1920
Albuminuria and War Nephritis among British Troops in France (3) 1919
Anærobic Bacteria and Infections, Reports on .. .. (3) 1919

Barbour, D. B. Hart and A. H. F. *Manual of Gynæcology.* (1) 4th Ed. 1890
Berkeley and V. Bonney, C. *Gynæcological Surgery* .. .. 2nd Ed. 1920
Berkeley and V. Bonney, C. *Gynæcology in General Practice* [2nd Ed.] 1919
Cunningham, D. J. *Manual of Practical Anatomy* (Ed. by A. Robinson) .. .. Vol. I. 7th Ed. 1919
Cushing, H. .. .. *Tumours of the Nervus Acusticus* 1917
Encyclopædia Medica .. .. Vol. VI. 2nd Ed. 1919
Findlay, L. .. .. *Syphilis in Childhood* 1919
Groves, E. W. H. *Surgical Operations* 1919
Ham, B. B. .. .. *Sanitary Law* (Ed. by H. R. Kenwood) 8th Ed. 1920
Harris, W. .. .. *Electrical Treatment* .. .. .. 3rd Ed. 1919
Hart, and A. H. F. Barbour, D. B. *Manual of Gynæcology* (1) 4th Ed. 1890
Hayes, Marie E. .. *At Work* .. .. (2) [1909]
Herman, G. E. .. *Difficult Labour* (Ed. by C. Oldfield) 6th Ed. 1920
Horsley and Mary D. Sturge, Sir V. *Alcohol and the Human Body* 6th Ed. 1920
Hurst, A. F. .. *Medical Diseases of the War* .. 2nd Ed. 1918
Ireland's Crusade against Tuberculosis. 3 vols. .. .. (2) 1908–9
Jellett, H. .. .. *Short Practice of Midwifery* .. (1) 5th Ed. 1908
Kent and A. J. Rosanoff, G. H. *A Study of Association in Insanity* (2) 1910
Laurens, G. .. .. *Oto-Rhino-Laryngology* (Trans. by H. C. Fox) 1919
McVail, J. C. .. *Half a Century of Small Pox and Vaccination* 1919
Mummery, J. H. .. *Microscopic Anatomy of the Teeth* 1919
Porter, W. G. .. *Diseases of the Throat, Nose and Ear* (Ed. by A. L. Turner) .. .. 3rd Ed. 1919
Pringle, J. J. [Ed.] *Atlas of Skin Diseases* .. .. (1) 1897
Pye, [W.] .. .. *Surgical Handicraft* (Ed. by V. Z. Cope) 14th Ed. 1919
Rosanoff, G. H. Kent and A. J. *A Study of Association in Insanity* (2) 1910
Sturge, Sir V. Horsley and Mary D. *Alcohol and the Human Body* 6th Ed. 1920
Wallace, J. S. *Child Welfare* 1919
Whitla, Sir W. .. *A Dictionary of Treatment* .. .. 6th Ed. 1919
Wilson, R. M. and W. M. T. *War Diseases and Pensions* 1919
Wound Shock and Hæmorrhage .. .. (3) 1919

TRANSACTIONS, REPORTS, JOURNALS, &c.

American Laryngological Association, Trans. of the 1918
American Surgical Association, Trans. of the .. .. Vol. XXXVI. 1918
British Medical Journal, The .. .. Vol. I. for 1919
Dermatological Society of London, Trans. of the 1919–20
English Catalogue of Books for 1918.. 1919
Johns Hopkins' Hospital Reports .. .. Vol. XVIII. 1919
Lancet, The .. .. Vol. I. for 1919
Medical Society's Transactions .. .. Vol. XLII. 1919
Ophthalmological Transactions .. .. Vol. XXXIX. 1919

MEETINGS OF SOCIETIES.

Bristol Medico-Chirurgical Society.

December 10th, 1919.

I. WALKER HALL, M.D., President, in the Chair.

MAJOR F. P. MACKIE, I.M.S., gave (by invitation) an address on **Disease in Mesopotamia.**

Dr. D. S. DAVIES opened a discussion on **The problem of malaria under post-war conditions.** The following took part in the discussion—Dr. S. J. KERFOOT, Dr. CECIL CLARKE and Dr. NIERENSTEIN (by invitation).

The following altered form of Rule 7, as passed at the last meeting, was confirmed :—

> "The Subscription to the Society shall be One and a Half Guineas per annum, payable in advance ; this sum shall include the subscription to the *Journal* and the use of the Library, with the privileges appertaining to the circulation of Library books."

January 14th, 1920.

I. WALKER HALL, M.D., President, in the Chair.

Mr. A. J. WRIGHT read notes on and showed two cases of **Congenital post-nasal stenosis.**

Mr. A. L. FLEMMING showed **A simple type of dropper for the administration of open ether.**

Dr. F. H. EDGEWORTH read notes on some cases of **Lethargic encephalitis.**

Dr. J. O. SYMES read notes on a case of **Pancreatic insufficiency.**

February 11th, 1920.

I. WALKER HALL, M.D., President, in the Chair.

Dr. G. A. BUCKMASTER gave an Address on **Additions to our knowledge of the physiology and pathology of the blood.**

March 10th, 1920.

I. WALKER HALL, M.D., President, in the Chair.

Dr. E. C. WILLIAMS showed (1) **A case of Muscular Dystrophy**; (2) **A case of hemorrhagic encephalitis with post-diphtheritic paralysis**; (3) **A case of diplegia.**

Dr. CAREY COOMBS read notes on **Irritable heart in civil practice.**

Dr. C. E. K. HERAPATH read notes on **Irritable heart in pensioners.**

Dr. A. G. MORRIS (by invitation) read notes on **Irritable heart in soldiers.**

Dr. A. BIRRELL (by invitation) read notes on **Post-influenzal tachycardia.**

Local Medical Notes.

EXAMINATION SUCCESSES.—Students of the University have recently passed the following examinations:—

UNIVERSITY OF BRISTOL.—*M.B., Ch.B.*—*1st Examination:* L. Dunn, E. F. King, G. M. Minifie, C. P. Porter, G. A. S. Thomas. *2nd Examination, Part I.:* A. T. Binnie, S. H. Blacker, A. P. Bodman, E. G. Bradbeer, E. R. Clutterbuck, B. A. Crook, B. V. Dawkins, H. M. Dixon, R. H. Dummett, G. R. Dunn, F. R. Edbrooke, N. J. England, P. G. Evans, H. M. Golding, W. A. Gornall, J. L. Griffin, R. C. Hatcher, A. G. Heron, E. G. Hill, J. A. James, F. G. Jenkins, D. E. Joscelyne, P. C. Joscelyne, E. F. King, P. H. Knowles, A. H. Marshall, J. R. N. Lailey, K. F. Platt, A. S. Prowse, A. Skardon, R. A. Sammons, H. L. Shepherd, H. E. Sherwell, H. J. Spreadbury, H. Taylor, R. E. Whitby. *Part II.:* F. H. Bodman, J. M. Evans, J. E. S. Hamilton, F. J. Hector, M. G. Hughes, J. M. Jones, A. J. Keevil, E. C. Kenderdine, F. Langford, C. H. Osmond, D. M. Pullen, D. Staley, I. Williams, B. A. Crook, H. L. Shepherd, H. J. Spreadbury. *Anatomy:* G. B. Bush, C. L. Griffiths, G. S. Mundy, M. Taylor. *Final Examination, Part II.:* G. A. Astley-Weston, H. M. Brown, D. G. Cossham, S. Datta, F. V. Jacques. *Part I.:* K. W. Chan, M. Wadsworth.

D.P.H.—W. D. Scott. *Part I.:* S. H. Kingston, A. D. Symons, G. C. Williams.

DIPLOMA IN DENTAL SURGERY.—*2nd Examination:* N. H. Bodenham, K. G. Hyland, W. Bayly, L. C. Bodey, E. E. Lewis. *Part I.:* J. C. L. Phillips.

B.D.S.—*2nd Examination:* G. N. Season.

CONJOINT EXAMINING BOARD.—*Surgery:* F. V. Jacques. *Midwifery:* M. A. Distaso.

L.S.A.—*Medicine, Part II.:* W. E. Neale.

L.D.S., R.C.S. ENG.—*Mechanical Dentistry:* L. H. Buchan, I. Jacobs, E. R. Pfaff, A. J. Constance. *Dental Metallurgy:* L. H. Buchan, C. E. Down, R. B. Hylton, J. C. L. Phillips, H. H. Watkins. *Final Examination, Part I.:* H. F. Buchan, B. Leathlean, E. F. Vowles, I. Jacobs, L. H. Buchan, E. R. Pfaff. *Surgery only:* H. B. Long. *Part II.:* E. E. Wookey, H. B. Long.

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